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Influence of Mission, Audience, and Policy Context on Issue Framing: A Case Study of Mobilization Against Hydraulic Fracturing in the Marcellus Shale

Rezwana Zafar
University of Vermont

INFLUENCE OF MISSION, AUDIENCE, AND POLICY CONTEXT ON ISSUE FRAMING: A CASE STUDY OF MOBILIZATION AGAINST HYDRAULIC FRACTURING IN THE MARCELLUS SHALE

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Rezwana Zafar

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Thesis Examination Committee:

Clare Ginger, Ph.D., Advisor
Richard Watts, Ph.D., Defense Chairperson
Robert Bartlett, Ph.D., Studies Chairperson
Walter Kuentzel, Ph.D.
Cynthia J. Forehand, Ph.D., Dean of the Graduate College

ABSTRACT

The case of mobilization against hydraulic fracturing by interest groups provided an opportunity to examine the influence of three factors (mission, audience, and policy context) on diagnostic, prognostic, and motivational framing. A comparative analysis was conducted of the mobilization activities of five national environmental organizations with a local presence in the Pennsylvania and New York Marcellus Shale regions. The organizations varied with respect to organizational mission, the audiences they were targeting (urban and rural), and the policy context in which they worked (pro and anti-hydraulic fracturing). Data came from eleven semi-structured in-depth interviews with organization personnel, and from the organizations' websites and published documents.

The results of this research show how the organizations use diagnostic, prognostic, and motivational framing to mobilize citizens against hydraulic fracturing. They illustrate the influence of organizational mission, audience (urban versus rural), and policy context in how the groups take on these framing tasks. Overall, the findings provide insights into the variation in frames and framing that can occur at the organizational level inside a movement. They illustrate the explanatory value of investigating multiple factors as they affect diagnostic, prognostic, and motivational framing.

DEDICATIONS

For Ammu, Appu, Omid, and Papa.

And Nanabhai.

Inna lillahi wa'inna ilaihi raji'un
إِنَّا لِلَّهِ وَإِنَّـا إِلَيْهِ رَاجِعونَ

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CHAPTER 1: INTRODUCTION

Snow & Benford (1988) described a three-part framework as an approach to analyzing how social movements mobilize participants through a process of framing. The framework is constituted of three core tasks: diagnostic, prognostic, and motivational framing. Their thesis was that "variation in the success of participant mobilization… depends on the degree to which these three tasks are attended to" (Snow & Benford, 1988: 199). In 2000, they described an array of factors that can be expected to influence how social movement organizations frame issues, with a focus on cultural opportunities and constraints, targeted audiences, and political opportunity structures (Benford & Snow 2000). Their work and the work of others on framing in social movement mobilization highlights dynamic processes that take place through various mechanisms and affected by multiple factors. Recent work in this arena calls for more research on these processes with respect to the factors that influence them (Snow, Benford, McCammon, Hewitt, & Fitzgerald, 2014).

Snow et al. (2014) provided a historical narrative of the founding and development of the framing perspective in social movement theory, and assessed recent and new directions for research in this area. They reviewed studies published between 2002 and 2011, and found relatively few (11) that used framing as a dependent variable. The independent variables in these studies included cultural context, political opportunity, collective identity, and interactions with others in the field; most of the studies (8) considered a single factor. Snow et al. (2014: 37) concluded that a

"significant portion of framing research focuses on frames as artifacts," and called for greater attention to framing as a process including attention to what factors affect framing and how.

This research examines processes of framing in interest group mobilization against the energy production practice of hydraulic fracturing in the Marcellus Shale area of the United States. It draws on Benford & Snow's (1988) three framing tasks, and offers evidence about how the tasks were undertaken by movement organizations, while simultaneously being affected by three factors, organizational mission, audience, and policy context. The case of interest group mobilization in opposition to hydraulic fracturing in the Marcellus Shale provided a good opportunity to examine these factors because it encompassed (1) a distinguishable set of organizations that were working to mobilize participants on the ground, (2) two distinct policy contexts at the time of the study (Pennsylvania had a pro-hydraulic fracturing policy and New York had placed a moratorium on the practice), and (3) two distinct audiences targeted for mobilization by the organizations (rural/close proximity to areas for development and urban/distant from areas for development).

The results of this case study provide insights into the variation in frames and framing that can occur at the organizational level inside a movement. This includes both intra- and inter-organizational variation. It illustrates how these variations occur in the context of the framing tasks described by Snow & Benford (1988) and how these variations may be attributable to context-specific factors. In brief, as one might anticipate, organizational mission, audience, and policy context affect how national

environmental organizations framed the issue of hydraulic fracturing in the Marcellus Shale region. More importantly, this study illustrates the variable and interactive effects of these factors on the tasks of diagnostic, prognostic, and motivational framing. In so doing, it provides a multi-faceted and interpretive study of the complexity and patterns of framing processes that occur in interest group mobilization efforts.

The following chapters provides (1) a literature review of the theory of framing in social movement mobilization, (2) description and background information about the hydraulic fracturing case, (3) methods for data gathering and analysis, (4) results, and (5) implications and suggestions for future research.

CHAPTER 2: LITERATURE REVIEW:

FRAMING IN SOCIAL MOVEMENT MOBILIZATION

The theory of framing was introduced in sociology by Erving Goffman. For him, frames are a "schemata of interpretation," which allow people to view occurrences in the world through an interpretive perspective (Goffman, 1974). Follow-up work in the theory of framing suggested that controversies occur when parties hold conflicting frames, that is, disputes arise when different stakeholders present multiple perspectives simultaneously (Schon & Rein, 1994). Indeed, within the environmental movement, environmental issues are framed to include concerns such as land conservation and preservation, wildlife conservation, air and water pollution, waste management, toxics control, nuclear fallout, environmental health, social-environmental justice, energy production and consumption, urban ecology, green buildings, greening of the economy and jobs, and climate change (McLaughlin & Khawaja, 2000). In such a context, one might ask whether there exist limitless ways to frame environmental issues, and how mobilization occurs in the context of varied and potentially conflicting frames held by individuals and social movement organizations.

Building on Goffman's work on framing, Snow, Rochford, Worden, & Benford (1986) posited "frame alignment processes" to describe how frames are used in mobilization to connect individuals with social movement organizations. In brief, they argued that frame alignment is necessary for movement organizations to successfully engage individuals as participants in a movement. They described four aspects of alignment: frame bridging, frame amplification, frame extension, and frame

transformation. Their theoretical goal was to create a "conceptual bridge that links social-psychological and structural/organizational considerations on movement participation" (Snow et al. 1986: 476).

Extending this work to explain variations in success in participant mobilization, Benford & Snow (1988) outlined three framing tasks: diagnostic, prognostic, and motivational framing. They argued that the degree to which these framing tasks are "developed and interconnected in a complementary fashion" by movement organizations affects the degree of participant mobilization (Benford & Snow, 1988: 213). The three framing tasks provide a framework to describe and analyze how framing processes play out as social movement organizations attempt to build movements and gain positive outcomes.

2.1. The Three Core Framing Tasks

In diagnostic framing, the problem and causes of the problem are identified. In prognostic framing solutions and agents to implement the solutions are identified along with strategies and tactics. Thus, the identified problem is granted a means to address it. The final core task is motivational framing, which provides rationale for engaging in collective action. As Snow & Benford (1988) pointed out, diagnosing a problem and suggesting steps for solution to an issue do not necessarily lead to mobilization; the third task of motivating action is critical to successful mobilization. Although the three framing tasks of diagnostic, prognostic, and motivational framing overlap in intention and meaning, they are distinct from one another. Characterizing framing in this

framework of tasks can provide insight into the variations in and dynamics of framing that exist within and between social movement organizations.

2.2. Frame and Framing

In their review of the social movement framing literature, Snow et al. (2014) make the distinction between static and dynamic dimensions of social movements, that is, the difference between the noun "frame" as product, and the verb "framing" as process. Early research focused on what Snow et al. (2014: 30) label as the "frame name game," followed by subsequent work to study the "negotiated and contested dimensions of collective action frames and framing." Both the product "frame" and process "framing" can be articulated in the core framing tasks Snow & Benford (1988) outlined previously. In diagnostic framing, a problem is identified and causes are posited; in prognostic and motivational framing, the issue is examined for further action. In each of these contexts, one can characterize mobilization efforts from the standpoints of both the noun "frame" and the verb "framing."

Snow & Benford (1988) argue for the importance of coherence in connections between the problem and solution frames for effectiveness in movement organization mobilization. In a context of multiple organizations undertaking these framing tasks with potential for variation and shifts in frames and framing, it is reasonable to consider how variation in framing might arise in a movement where movement organizations are working to gain support in varied contexts. This suggests the importance of considering what factors affect frames and framing tasks.

In their review of social movement framing research published between 2002 and 2011, Snow et al. (2014) found 32 studies that looked at framing within a causal context. Twenty-one of the studies explored framing as an independent variable (affecting outcomes, mobilization, emotions, solidarity and fundraising), nine consider framing as a dependent variable (affected by cultural context, political opportunity, collective identity, and interactions with others in the field), and two examined movement framing as both independent and dependent variables. Most of the studies included in their review draw on qualitative data (i.e. speech acts, interviews, participant-observations) and provide qualitative, interpretive descriptions and analysis of framing as a process.

For the studies that included framing processes as a dependent variable, most examined only one independent variable. An exception is Oselin & Corrigall-Brown (2010) who explored how multiple factors (local context, movement-countermovement dynamics, ability to assuage oppositional challenges, intra-movement unity) affected tactics associated with movements. This study considered how these factors shaped overall movement trajectory (Oselin & Corrigall-Brown, 2010). Reese & Newcombe (2003) investigated how political and cultural conditions and organizational ideology affected framing choices. Horton (2010) examined the effects of collective identities and cultural context on framing processes of mobilization. None of these studies differentiated how the factors they considered affected the three framing tasks (diagnostic, prognostic, and motivational) described by Snow & Benford (1988).

Citing a relative gap in the literature about frame variation and factors influencing such variation, Snow, Vliegenthart, & Corrigall-Brown (2007) conducted a statistical

analysis of the variation in framing of the French riots of 2005 as these appeared in newspapers in six countries. They characterized the content of framing based on diagnostic and prognostic framing tasks, and tested for the effect of country/contextual variables, newspaper characteristics, time frame, and framing sources. They found the factors that showed the strongest statistically significant relationships to framing were the identities of the actors in the field and temporal variation. They did not find a statistically significant difference in framing based on country (Snow et al., 2007).

Snow & Benford (1988) focused on how engagement in framing tasks by social movement organizations affects success in participant mobilization. Given the relevance of these tasks to movement success, it is important to consider how they might be affected by contextual factors as these are filtered through social movement organizations. Gaining insight into such factors can provide a fuller understanding of variation in frames as these are connected to intra and inter-organizational complexity in social movements. Noting this and drawing from Snow et al.'s (2014) review of the framing literature, the effects of three factors on framing tasks have been analyzed in this study: organizational mission, audience, and policy context.

2.2.1. Collective Identity Reflected in Organizational Mission

The literature on framing makes the case that collective identity in movement participation is a shared effort between movement organizations and the public. Reese & Newcombe (2003) make a case that organizational ideologies shape their framing of issues. They describe how collective action frames are influenced by "core norms,

values, and beliefs" of organizations in welfare rights groups. Organizational missions of social movement organizations are one indication of collective identity. For many organizations, their mission is a public statement of what they stand for, and are a declaration of a collective group's core purpose or focus. They reflect collective organizational beliefs and values.

While broad or multi-dimensional frames can be effective in mobilization, Dunlap & Mertig (1992) emphasize that organizational frames should be concise, finite, and relevant to their mission and vision. The scope of the organization should be based on their mission to avoid the slippery slope of "mission creep," that is, temporarily getting sidetracked and compromising primary goals. The identity of the organization can be lost if its scope of activities becomes too broad, which may compromise the quality of its membership. Resources and capacity may also limit organizations' use of frames when organizing. For instance, environmental organizations may not have enough funding to sign onto every environmental issue that emerges, despite having shared investment in combatting wide environmentally related problems. However, the literature suggests organizations work in collaboration with other groups who have similar missions. Using a small and finite number of frames, and being willing to work simultaneously in coalitions can allow organizations to build a complex and diverse movement.

2.2.2. Audience

Benford & Snow (2000: 630) wrote, "The target of the message can affect the form and content of the message." Framing in ways that resonate with varying audiences

is key to maximizing movement mobilization (Feinberg & Willer, 2013; McAdam, 1996). Early studies have shown how organizations reframe based on target audiences such as frontline communities as opposed to secondary communities (Benford & Hunt, 1992). Taking this into consideration, this research examined the dynamics between framing to mobilize rural/frontline communities as compared to urban/secondary communities. Framing strategies that attend to both not only may increase organizational membership, but also can create room for coalitions to form between different groups. This way, organizations can offer support for the different constituents' needs. Jasper & Poulsen (1995) research on animal rights and anti-nuclear movements exemplify how different issues can generate multiple audiences. The accumulation of audiences recruited by different organizations within a coalition can span a wider array of demographics, irrespective of political and interest-based ideologies, and mobilize citizenry.

2.2.3. Political Opportunities as Policy Context

The literature on social movements includes consideration of how social movement organizations use political opportunities in framing processes. Gamson & Meyer (1996) suggest that in some cases, political opportunities are relied on by such organizations and are central to collective action frames. Benford & Snow (2000) explain in the event of challenges to preexisting political structures, movement organizations may see an opportunity to push for social change. Interpreting policy context as a political opportunity allows room for change in the form of action (Gamson

& Meyer, 1996). In action to build coalitions, the literature suggests that organizations tend to emphasize different frames to encourage collaboration among groups in line with their policy stance (Adair, 1996). In this way, movement organizations can use framing to maximize movement participation and the existing policy context can shape how organizations frame issues to build a movement. Benford & Snow (2000) further argue that opportunities arise out of a gap in the institutional system or when the introduction of a new system differs from the current system. This concept plays out in the Marcellus Shale, where different states in the region are confronted with a political choice to approve or ban hydraulic fracturing. In this context, movement organizations in the region may self-identify as players in the policy arena by working to mobilize action in support of or against two distinct policy positions, one in favor of hydraulic fracturing and one against hydraulic fracturing. This study was limited to groups that opposed hydraulic fracturing due to time constraints.

2.3. Case of Hydraulic Fracturing in the Marcellus Shale Region

At the time of this study, energy production through hydraulic fracturing in the Marcellus Shale regions had gathered significant attention and controversy (Brasier, Filteau, McLaughlin, Jacquet, Stedman, Kelsey, & Goetz, 2011). The region stretches across Ohio, West Virginia, Pennsylvania, New York, and smaller areas of Maryland, Kentucky, and Tennessee (Allen, 2012) (See Figure 1.). In 2012, the U.S. Energy Information Administration released a report confirming that the Marcellus Shale contains 141 trillion cubic feet of recoverable reserves of national gas, making this region

the largest source in the world. Pennsylvania's Washington County was the first hydraulic fracturing site in the Marcellus Shale in 2002; at the time of this study this county was one of the top-five gas producers in the U.S. (Allen, 2012). In contrast, at the start of this study, New York had issued a moratorium on hydraulic fracturing while drilling regulations were under review. Drilling activity in the New York portion of the Marcellus had not occurred largely due to ongoing public resistance (Brasier et al., 2011). New York policy eventually established a statewide ban on hydraulic fracturing (NYS Department of Environmental Conservation, 2014).

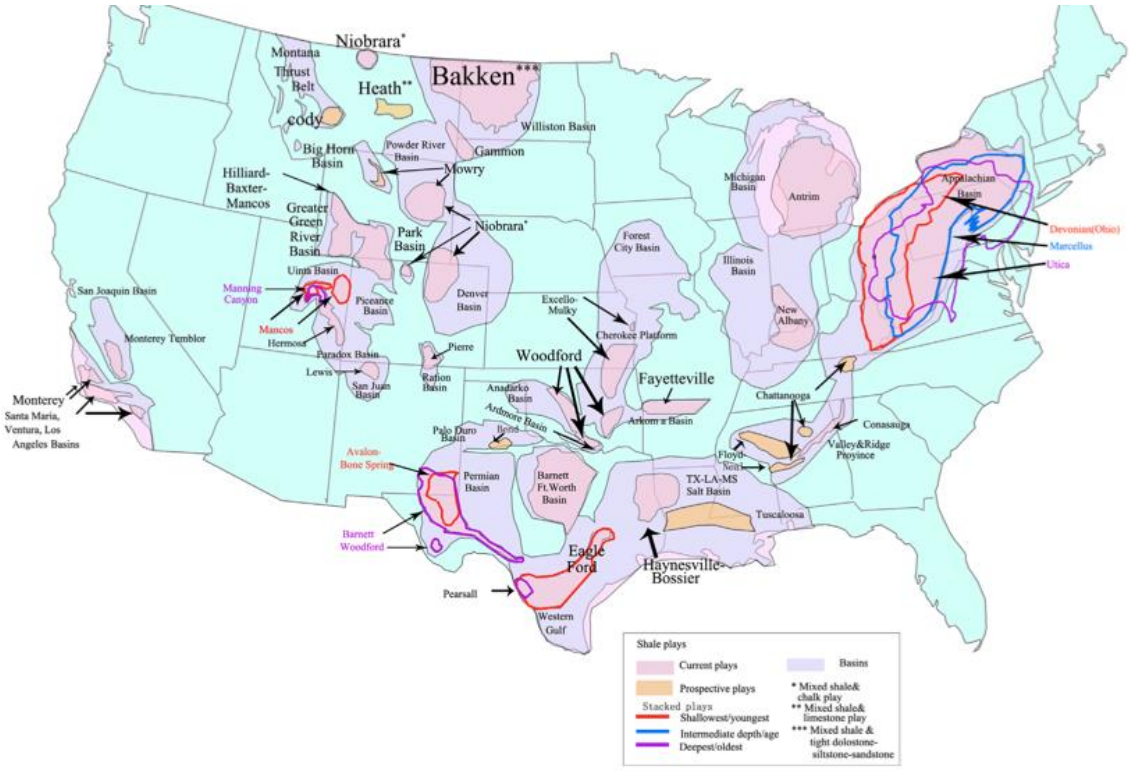

Figure 1: Map of U.S. lower 48 states Shale Gas plays

To date, the literature on the social dimensions of hydraulic fracturing has focused on public perception (Boudet, Clarke, Bugden, Maibach, Roser-Renouf, & Leiserowitz,

2014; Brasier et al., 2011; Brasier, McLaughlin, Rhubart, Stedman, Filteau, & Jacquet, 2013; Schafft, Borlu, & Glenna, 2013), media coverage (Evensen, Clarke, Jacquet, & Stedman, 2014; Stedman, Jacquet, Filteau, Willits, Brasier, & McLaughlin, 2012), economic impacts (Marongiu-Porcu, Economides, & Holditch, 2013), and legal cases (Allen, 2012; Coman, 2012). Two recent articles consider the relationship of framing to hydraulic fracturing, where framing is the independent variable. Finewood & Stroup (2012) write about how frames affect decision-making about the practice. Dodge (2015) examines framing of hydraulic fracturing in New York through the perspective of deliberative democracy. She considers how framing strategies may promote greater reflexivity in the context of a highly conflicted policy debate, and uses framing as an independent variable affecting policy discourse (Dodge, 2015).

Considering calls for more studies to examine variation in framing with framing as the dependent variable (Snow et al., 2007; Snow et al., 2014), interest group efforts to mobilize opposition to hydraulic fracturing in the Marcellus Shale region offered a natural experiment to assess the effects of mission, audience, and policy context on issue framing. A total population of five national organizations have been active against hydraulic fracturing with an organizing presence on the ground in the region (Americans Against Fracking, 2014). These organizations were attempting to mobilize audiences in urban and/or rural settings within two different policy contexts: Pennsylvania state policy promotes the practice and New York policy places a moratorium on the practice. Figures 2 and 3 illustrate the overlap between the Marcellus Shale and the two states. As such, an opportunity was presented to examine the influence of these factors on how national

environmental organizations are strategizing to mobilize the public on this issue. Chapter 3 outlines the justification, as well as the methodology used to conduct this research study.

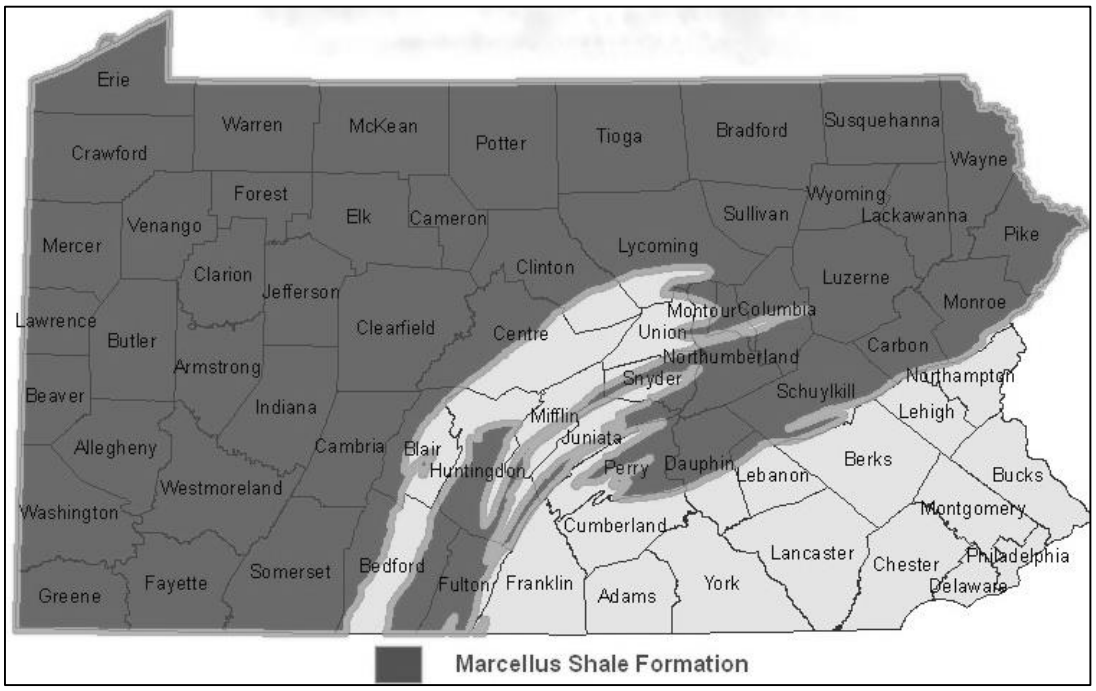

Figure 2: Pennsylvania and the Marcellus Shale

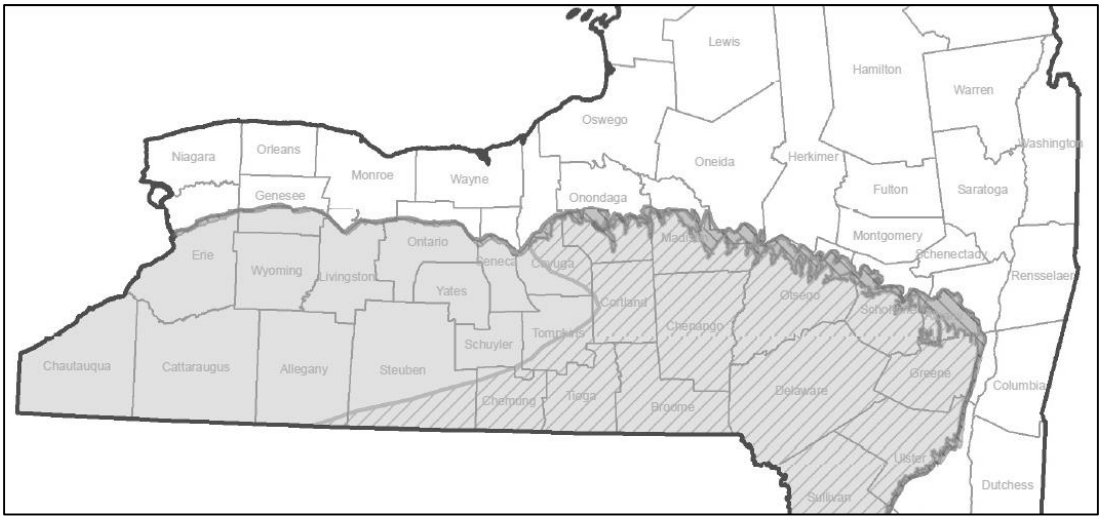

Figure 3: New York and the Marcellus Shale

CHAPTER 3: RESEARCH METHODOLOGY

The purpose of this study was to examine how factors of mission, audience, and policy context affect how organizations frame the issue of hydraulic fracturing to mobilize opposition. It assesses variation in frames and framing that occur at the organizational level inside the movement against hydraulic fracturing and in the context of the framing tasks described by Benford and Snow (1988). The findings of this study add to the literature on framing by considering how variation in framing can be explained by context specific factors as these are connected to organizing practices. Prior research does not currently exist to show how the combination of the factors (mission, audience, and policy context) affects each of the three tasks of diagnostic, prognostic, and motivational framing.

The controversy of hydraulic fracturing in the Marcellus Shale region provided an opportunity to look at core framing tasks within the context of the environmental movement. This study considered how product "frame" and process "framing" are linked to the core framing tasks. Therefore, this study is a combination of frame and framing, where framing is the dependent variable. As such, this research posed the following questions:

3.1. Research Question

How do mission, audience, and policy context affect how national environmental organizations frame the issue of hydraulic fracturing to mobilize opposition?

3.2. Research Objectives

The objectives of this research study were:

1. Determine how national environmental organizations use diagnostic, prognostic, and motivational framing in mobilizing opposition against hydraulic fracturing.
2. Characterize how organizational mission influence the ways of framing.
3. Characterize how audience (urban and rural) affects framing of hydraulic fracturing, and assess whether and how organizations reframe the issue of hydraulic fracturing based on audience types.
4. Characterize how the policy context affects framing of hydraulic fracturing, and assess whether and how organizations reframe the issue based on policy context.
5. Evaluate how the factors of mission, audience, and policy context intersect in diagnostic, prognostic, and motivational framing tasks.

3.3. Research Approach

Theoretical foundations shape and inform research design and provide rationale for the choices of research methods and the ways in which they are applied (Crotty, 1998). Qualitative research often aims to generate and/or test theory. (Patton, 2012). It can provide a way for researchers also develop explanations of actions, narratives, and the relationships between theory and practice (Glesne, 2011). The research in this thesis stems from qualitative methodologies, drawing specifically from a case study approach.

Stake (2000) distinguishes three types of case studies: intrinsic, instrumental, and collective. The intrinsic case study focuses on the case itself as the primary point of

interest. Instrumental case study refers to restructuring or redrawing a generalization, where the case becomes secondary to understanding a particular phenomenon. Finally, collective case study is when researchers study several cases within the same project to understand a phenomenon. This research uses instrumental case study to inform theory about framing through data about the case of organizing in the Marcellus Shale region.

In this research, qualitative case study was a useful research approach to identify and interpret the ways in which factors of mission, audience, and policy context affect framing by social movement organizations working to mobilize opposition to hydraulic fracturing. Qualitative descriptions of people from the organizations, and the representations on their websites and in documents provided important data to describe how they frame the issue. Qualitative, comparative analysis provided an avenue to interpret these data.

3.4. Methods

This study was a comparative case analysis of national level organizations in New York and Pennsylvania that draw on distinct strategies to mobilize opposition to hydraulic fracturing. These included those who are calling for stricter regulations or a ban through strategies such as (1) education and raising awareness in communities, (2) coalition-building, (3) communicating with public policy decision makers, and (4) taking legal action. This research identified a total population of five national environmental organizations mobilizing opposition to hydraulic fracturing on the ground in Pennsylvania and/or New York. These organizations hold 501(c) nonprofit status, and

are understood to work on a national level because their efforts span across the boundaries of more than one state (Americans Against Fracking, 2014), reaching the wider American public through multiple issue areas (Carmichael, Jenkins, & Brulle, 2012). They also are opposed to hydraulic fracturing and have offices in rural and/or urban settings in New York and/or Pennsylvania (See Table 1 & 2). This study focused on these organizations not only for their national presence, but because they also have a local presence in the New York and/or Pennsylvania Marcellus Shale regions. Other organizations are active on the hydraulic fracturing issue, but are active either on-the-ground or at a broader scale – not both. Focusing on a population of organizations that are active on both levels provided a strong basis for a comparative case study.

Table 1: Interest groups office by location, with respect to the Marcellus Shale

Interest Groups	New York Location	Pennsylvania Location
A		Philadelphia, PA [1]Pittsburgh, PA [2]Harrisburg, PA
B		[3]Franklin County, PA
C	[4]Ulster County, NY	
D	New York, NY	Philadelphia, PA
E	New York, NY	Philadelphia, PA

[1]Pittsburgh (Allegheny County), on the Marcellus Shale in PA
[2]Harrisburg (Dauphin County), on the Marcellus Shale in PA
[3]Franklin County borders Marcellus Shale in PA
[4]Ulster County is on the Marcellus Shale in NY

Table 2: Interest groups organizing in rural and/or urban areas

	Rural Setting		Urban Setting	
Interest Groups	**New York**	**Pennsylvania**	**New York**	**Pennsylvania**
A		X		X
B		X		
C	X			
D		X	X	X
E			X	X

Eleven semi-structured interviews with personnel in the five national environmental organizations were conducted, with 2-3 interviews per organization (See Appendix A.2.3. for interview guide). The number of personnel from each organization was determined by the size of the staff for each group. Each of these interviews was performed with voluntary participants in 30-45 minute sessions. While most of the interviews were conducted in person in the offices and settings of the organizations, some were performed over the phone. Every participant agreed to be recorded, however, all were promised confidentiality and given codenames (i.e. organizations A to E, as listed in Table 2.). Data from organizational documents and websites have also contributed to support findings. These methods provided insight into how these organizations have framed the hydraulic fracturing issue, and work to mobilize specific audiences.

Interview data for this research was transcribed verbatim using the software, HyperTRANSCRIBE. Recorded notes regarding the organizations' history with the hydraulic fracturing issue, as well as the participants' working relationship with the organization were tracked in an Excel document for reference. This background information provided context as to how the organization has been framing the issue, as well as how informed and invested the participants were with their host organizations.

Data for this research were categorized according to organization. Patterns and emergent themes were tracked using HyperRESEARCH, as well as Word Document.

A comparative analysis was conducted in this research, while considering organizational mission, audience, and policy context. The comparative analysis examined both organizations individually across the factors, as well as among the different organizations. First, organizations were examined separately to find whether they varied their framing within different audiences and/or different policy contexts. Second, a comparison between organizations was made to consider how different organizations framed the issue as this related to their mission, audiences, and policy contexts. Thematic coding was used to describe the frames the organizations used as they relate to varied audiences and policy contexts. This allowed a systematic examination of the ways organizations converge and diverge in their organizing strategies and approaches to framing tasks. The data were categorized into groups, and emergent themes were identified to contribute to the theory of framing.

One thing to note is the significance of language in discussing hydraulic fracturing. Evensen, Jacquet, Clarke, & Stedman (2014) find that for technical professionals, the word means a very specific activity vis-a-vis the fracturing of shale using high pressure injections; on the other hand, opponents have broadened its meaning to encompass the entire scope of operations involved in horizontal drilling. In other words, the term "fracking" has been colloquially come to mean not just one specific step of fracturing wells, but also the entire life-cycle activity before and after drilling. This paper will henceforth use the colloquial term, "fracking" when referring to hydraulic

fracturing, because interest groups mobilizing opposition to hydraulic fracturing have been using this language. As this research drew from qualitative methodology, it is important to correspond with organizers' choice of language to describe the processes and impacts in question.

CHAPTER 4: RESULTS

The following subsections outline the factors that affect how interest groups strategically use the framing tasks to mobilize opposition to fracking. Data show the ways organizations use diagnostic, prognostic, and motivational framing in the fracking issue and how organizational mission, audience, and the policy context affect these framing tasks. The three framing tasks as they have been undertaken by the organizations included in this research are addressed in turn in, followed by an analysis of the influence of the three factors on the framing tasks.

4.1. Diagnostic Framing

Snow & Benford (1988) and Benford & Snow (2000) identify diagnostic framing as the process in which the problem is identified and causal attribution is established, and granted an associated frame. Table 3 summarizes the how the five organizations have approached the diagnostic framing with respect to identifying the problem and positing causal attribution.

Table 3: Diagnostic framing

Diagnostic Framing			
Problem identified		**Causal Attribution**	**Interest Group**
Environmental Risks	Water, air, land	Industry	ABCDE
Public Health Risks	Water, air, health	Industry	ABCDE
Economic Risks	Land	Industry	BC
Social Risks	Neighborhood rights, labor, nuisance, etc.	Industry	BC
Democratic/ Civil Rights	Regulatory structure, government system	Government	B

4.1.1. Environmental and Public Health Risks

Based on the interview data, results show the organizations in this study primarily diagnose fracking as an environmental and public health issue. Just as the literature has identified the different risks of fracking (See Appendix B.4. for a comprehensive look at hydraulic fracturing literature on risks and benefits), these groups highlight environmental risks to draw attention to the fracking issue. For them, fracking poses threats to clean water and air. They are concerned about water contamination due to chemical leaks and spills in the fracking process. They have also questioned the adequate disposal of wastewater, and subsequently perceive fracking as a threat to groundwater, surface water, and other valuable watersheds. These groups identify links between environmental contamination and negative public health impacts. Many of the environmental issues are tied closely with public health. Data from the organizations' websites and published documents support this connection. In brief, the organizations classify human exposure to chemicals used in the fracking process as detrimental to public health. This is reinforced with website contain images of drilling sites and children in close proximity wearing gas masks as symbols of these risks.

4.1.2. Social and Economic Risks

Interview data from Organizations B and C reveal that their diagnostic framing has extended beyond environmental and public health risks. They framed fracking with links to broader social issues. These include neighborhood development rights with regards to zoning and granting communities access to their own lands. They have also

related fracking to labor issues, and are demanding appropriate labor rights and protection of workers safety. They are advocating against the alteration of communities as a result of increased truck traffic, noise level, local road damages, crime rates, resulting in the overall transformation of rural community identity. Website and organizational document support this. The data provide lengthy texts describing negative consequences of shale gas development and offer ways to combat industry. Organization B and C have also framed fracking from an economic risk viewpoint. For them, decreased property value due to shale gas exploration is a key argument. Both interview and website data discuss the notion of boom and bust economy, and question trusting industry to properly compensate landowners. Stress on healthcare systems and public schools are also risks articulated by these two organizations.

4.1.3. Civil Rights Risks

Organization B has identified fracking as part of a larger civil rights issue. Although they are an environmental organization and draw from environmental and public health risks, their main focus in organizing against fracking has been on risks associated with the democratic process:

> We don't have a fracking problem, we have a democracy problem. The majority of people within the community don't currently possess the legal authority to get the outcomes they want. So our work is much more about civil rights and the rights of the community to govern, than about the specific activity [like fracking]. If you didn't have a democracy problem – the denial of your right to say no to corporate harms, you wouldn't have a fracking problem…because your community wouldn't be told it's illegal to say no (Organization B).

Unlike the other national groups, organization B has identified a gap in the current democratic system. They have identified the issue of fracking as a threat to the civil rights of people living in communities where the practice is underway. For them, fracking has violated the Clean Air Act and the Clean Water Act, yet it continues to be supported by government agencies. Thus, they frame fracking in terms of risks to democracy and civil rights.

4.1.4. Causal Attribution

All of the organizations have identified industry as the cause of the environmental and public health risks they associate with fracking. Their diagnoses of these risks are attributed to industry polluting and violating federal laws designed to protect the public. Similarly, the social and economic risks associated with fracking are attributed to industry as the cause of the problem. Organizations B and C diagnose the issue to encompass a wider array of risks as a way to hold industry accountable for any damages fracking may cause: "When we're talking about fracking, we mean the whole thing: from signing a lease all the way to transport of materials" (organization C). This includes land rights, neighborhood disparities, issues in the local economy, and/or damages to local roads. Organizations B and C are making efforts to hold fracking industries accountable by attributing to them the social and economic impacts seen in communities in the areas where fracking is underway.

With respect to the democracy and civil rights problem, organization B finds the infrastructure of government and by extension, the democratic processes in Pennsylvania

and at the federal level, to have failed communities. They do not trust government institutions to manage risks associated with fracking, and diagnose the cause of the problem to lie in these institutions. In this way, organization B identifies government as the cause of the problem. This stands in contrast to other organizations working in Pennsylvania, some of which not only do not identify government as the cause of the problem but go further in seeing local government officials as their allies. For instance, organization A states, "There's a greater effort around our local government and I think that's produced a lot of good results for us. And I think that showed up when industry tried to get in." This point of contrast overlaps with the task of prognostic framing.

4.2. Prognostic Framing

Snow & Benford (1988) and Benford & Snow (2000) refer to prognostic framing as the process of identifying a solution, those who will implement the solution, and of attributing tactics to the issue at hand. In this task, the identified problem and its associated frame are granted a means to address it. Tables 4 and 5 breaks down the ways in which each of the five organizations has engaged with prognostic framing in their organizing strategies.

Table 4: Prognostic framing: solutions and responsible implementing actor

Prognostic Framing		
Solution	**Responsible Implementing Actor**	**Interest Group**
Regulate Industry	Government Agencies	ACDE
Ban Fracking	Legislature/Governor	DE
Change Government Processes	Citizens	B

4.2.1. Solutions and Responsible Actors

In prognostic framing, organizations A, C, D, and E characterize the solution to fracking as regulating industry, that is, to safely manage and administer the extraction of natural gas. They identify government agencies as the responsible implementing actors, where the public holds agencies accountable through citizen participation.

Another solution has been identified by organizations D and E who advocate for a complete ban. In the context of this solution, legislatures or state governors are the responsible implementing agents. Organization E states, "The state legislature – the Assembly, the Senate – they have the authority to proactively ban fracking. An actual ban would necessitate an act of the Legislature." This organization has taken this position in New York. Given the pro-fracking policy context of Pennsylvania, organization E shifts its position to push for a statewide moratorium, believing this to be a strong leverage for a future ban. They state: "We see a moratorium not as way to act, but using that pause as an opportunity to get studies and build more momentum for a ban on fracking. So in Pennsylvania, we need to move it back to sort of neutral before we can get into that ban mode."

With respect to organization B, their prognosis of fracking is based on identifying changes to the current government processes as the solution to fracking. Given that they diagnosed fracking as a democratic issue, their prognostic framing is dependent on addressing gaps in the government. As such, they classified citizenry as responsible implementing actors to reinvigorate democratic processes.

Table 5: Prognostic framing

Prognostic Framing		
Organizing Strategy		**Interest Group**
Generating and Disseminating information	Develop resources/ written materials/ electronic documents for communities	ABCDE
	Research and campaign to expose health impacts	ABCDE
	Programming to educate the public on democratic processes	B
	Presentations/ workshops to educate communities about their rights/ information on leasing smartly	C
Citizen engagement	Petitioning, tabling, community outreach	ABCDE
	Canvassing	AD
Media attention	Press release, emails, Facebook, Twitter	ABCDE

4.2.2. Generating and Disseminating Information

Interview and website data suggest that all five organizations rely on standard organizing tools as their primary ways of strategizing on the fracking issue. Each has generated informational resources for their audiences, and have developed written materials and/or electronic documents to distribute to communities. These documents range from defining fracking from "cradle to grave," to giving examples of the different risks associated with fracking. When they describe fracking to their membership, they describe it as signing a lease all the way to transport of materials. With the exception of organization B, all of these organizations are conducting research of their own, or else drawing from existing scientific research from academic institutions and/or state

regulatory departments in their campaigns to expose public health risks associated with fracking.

Notably, organization B and C have strategies that disseminate other types of information. Organization B has identified a problem with democratic process and a solution to change that process, initiated by citizens. This is reflected in their strategy of disseminating information related to democratic process. Organization C is disseminating yet another type of information, that is, about legal rights and leasing. This is linked to an approach they take to motivational framing (taking legal action), which is addressed in the next section on motivational framing below.

An important concept to note is the role of storytelling. All of these organizations recognize factual evidence and the distribution of information as important in prognostic framing; however, they identify its limitations if there is no story to go along with it. For instance, organization E states:

> What really influences people is other people. It's not a footnoted fact sheet. It's getting an email from a neighbor, it's talking to a real life person on the street, it's getting a letter from a friend. That's how most people develop opinions.

Furthermore, their websites and membership flyers contain quotes from frontline communities. In this way, these organizations draw from factual evidence and media attention, while relying on personal stories from impacted community to reach out to new audiences.

4.2.3. Citizen Engagement

Within the standpoint of prognostic framing, all of the organizations also focus on citizen engagement. They have used petitioning, tabling, and community outreach as organizing tools to engage citizenry. Organizations in urban areas such as A, D, and E distribute information via flyers, and ask the public to sign onto their petitions. They have stationed themselves in high traffic, politically progressive areas to maximize their outreach. Interview data also suggest that organizations in more rural areas use community spaces where they engage citizens. These include local schools, churches, and other venues to share knowledge and organize against fracking. All of the organizations also screen films regardless of urban or rural settings as another avenue of engagement.

Based on interview data, organizations A and D have also integrated canvassing as a tool for community engagement. They have identified key locations for canvassing based on how accessible these locations are in relation to their offices, as well as population density of the neighborhoods as a way to maximize their time. While organization A canvasses year round, organization D spends the summer seasons heightening their outreach in urban, suburban, and rural communities. In this way, organization D has identified key time periods where they can maximize their staff time and resources to engage citizens. Organization A also has a phone canvass asking their affiliates to renew their membership financially, which offers flexibility with staff time and allows them to increase membership remotely.

4.2.4. Media Attention

These groups integrate media attention as another tactic associated with prognostic framing. Interview and website data suggest they recognize the influence media has on the public, and occasionally rely on it to communicate their position to the general public. They hold press conferences to conventional media when possible. For instance, organization D explains that they communicate to the press when a new study emerges or when they publish new materials that document public health risks associated with fracking. In this way, these groups have established a way to elevate their messages using existing media platforms.

Organizations also use social media sites like Facebook and Twitter when new material arises. Using #banfracking and other similar hashtags, they are able to disseminate information quickly, prompt the public and their constituents into action, which may include attending a rally or signing a petition. Social media also serves as an organizing tool to distribute location information for public hearings, film screenings, rallies, and other similar public events. These groups recognize the important role social media plays in mobilizing the public, but it is only secondary to face-to-face citizen engagement. For them, prognostic framing reveals itself primarily as sharing personal stories of impacted communities, and secondarily using factual information through the media.

4.3. Motivational Framing

The final core task Snow & Benford (1988) and Benford & Snow (2000) describe is motivational framing. This task provides rationale for engaging in collective action. Interest groups in this case study have engaged in various organizing strategies as a way to mobilize opposition to fracking. Table 6 lists the different ways these groups have applied motivational framing in their organizing.

Table 6: Motivational framing

Motivational Framing		
Collective Action		**Interest Group**
Coalition building	Using shared messages in the coalition to increase strength in numbers and build capacity	ADE
	Collaboration between chefs, health professionals, labor groups, and other professionals	DE
	Direct communication with frontline communities and grassroots groups	BC
Political Action	Comment during public hearings	ACDE
	Write letters, participate in call-in-days to pressure elected officials, lobby at statehouse	ADE
	Endorse candidates in political races	D
	Draft community constitutional provisions	B
Legal Action	File lawsuits	BCD
	Direct communities to seek legal representation, help draft legal testimonies	C

4.3.1. Coalition Building

All of the organizations identify coalition building as a tool to mobilize citizenry and build capacity although they take different approaches to it. Interview and website data suggest that organizations A, D, and E find using shared messages within a coalition to collectively influence the public. They are seeking to build trust with each other, and foster credibility. Because the coalition includes various environmental organizations,

they are able to pull from and amplify various risks associated with fracking. They also identify building "strength in numbers" as essential to motivating the public to action. This approach to coalition building draws on common missions and diagnostic framing with respect to fracking.

In addition to working with environmental groups, D and E have also worked in collaboration with businesses, chefs, health experts, labor groups, and other professionals to diversify their messaging. The coalition website shows how these organizations work in collaboration and frame the problem in ways to broaden their networks and trigger a social movement. The movement they expect to create is one of diverse interests that embodies a variety of interests to which an array of audiences can relate. Their assumption is that, the coalition can reach a larger, more diverse audience than they would otherwise reach alone.

Organizations B and C make important distinctions between local and national groups in their choices for building coalitions. They place priority on building coalitions with frontline communities and local grassroots groups who work on the ground against fracking over building coalitions with other national environmental groups. This priority reflects their organizational missions that focus on work with those who are directly affected by fracking. Therefore, they see grassroots groups as their strongest partners. Organization C adds that there is merit in echoing frontline community voices, that is, those who are directly impacted by fracking. They note that the national anti-fracking mobilization looks very different from grassroots mobilization; for them, frontline communities may organize to stop truck traffic or engage in civil disobedience as a way

to disrupt fracking infrastructure. A national-level mobilization on the other hand, might be instrumental in bringing together groups from diverse perspectives to focus a national-scale spotlight on the issue.

4.3.2. Political Action

Political action from the standpoint of motivational framing is used by all five organizations. Like coalition building, these groups engage with political action in different ways. Organizations A, C, D, and E motivate their audiences to submit comments during public hearings. Organizations A, D, and E have similar organizational missions and mobilize their membership to dominate public hearings held by local and state agencies with messages that reflect their diagnostic and prognostic framing of problems and solutions. They use this as a political method to display their strength in numbers. Organization C sometimes encourages their constituents to participate in local government, as they work primarily with rural communities, some of which are affected by drilling activities. As such, organization C communicates the importance of public participation in municipal governments to their membership.

Organizations A, D, and E also galvanize their audiences to write letters as a way to challenge elected officials to change current policies with respect to fracking. They also organize audiences to participate in call-in days, where they flood the phones of key municipal officials or statehouse members as a way to make a statement against fracking. Those working in urban settings in particular, pressure elected officials by motivating the officials' constituents to rally outside of their offices. Furthermore, organization D has

made endorsements in political races. They feel they can encourage their membership to vote for candidates who are less sympathetic to fracking.

Organization B has drafted community constitutional provisions in their efforts toward motivational framing. They look beyond regulations and environmental law to make a case based on people's fundamental rights:

> Governments don't give us rights. We're born with them. And then we can create government to protect and secure those rights. When government issues permits to fracking companies that purport to legalize the violation of our right to clean air and clean water and a healthy environment, things our lives depend on, then we have the authority to nullify that. We don't think it makes much sense to try to reform the system that isn't ever going to recognize and protect rights. It actually has to be changed.

Organization B is working to address the gap between citizens and the democratic process. They educate communities about the democratic structure. Website data supports the notion that organization B works within impacted communities to draft and adopt ordinances that ban gas drilling. In these ways, organization B is challenging the current democratic and political system, and reintroducing the concept of people's authority through community consent.

4.3.3. Legal Action

Organizations B, C, and D have promoted legal action as a way to engage in collective action. For instance, interview data shows organization C has directed their audiences to seek legal representation. They have also drafted legal testimonies for their audiences. As a final mode of action, they have filed lawsuits on their constituents' behalves. The legal approach is an instrument of motivational framing in that, it provides

a catalyst for engaging in collective action. Website and organizational documents from organizations B, C, and D states that communities can choose to come forth collectively to file lawsuits against industry or government agencies. These organizations see the court system as a potential pathway to protect communities from industry. In this way, these organizations are enhancing the capacity of frontline communities to achieve a common objective against fracking.

4.4. Factors Affecting Framing Tasks

The following considers how each of the factors of mission, audience, and policy context has influenced the three core framing tasks individually.

4.4.1. Mission

Environmental organizations presented in this study are mission-driven. Their diagnostic framing reflects their efforts to frame fracking from an environmental and public health perspective, which correlates with their mission. As such, their core messaging reflects the environmental focus of their organizations. For example, organization D had this to say:

> As an environmental group, our legitimacy as a messenger mostly can relate to environmental issues. We can go out there about crime and increased homelessness because there's no affordable housing anymore. But we're not the right messengers for some of those things.

As stated before, organizations may occasionally broaden their diagnostic frame to include economic and other social risks to engage diverse audiences and increase membership. For instance, they have reframed the issue as related to broader social

issues when organizing rural communities that may be impacted by increased truck traffic due to fracking activities. Similarly, they sometimes reframe fracking as an economic risk when speaking to landowners. Nevertheless, their priority lies within the realm of environmental and public health because these issues correlate with their overall mission statements. They feel that framing fracking as an environmental and public health issue helps them to reach a broad audience.

In motivational framing, all of the organizations identify coalition building as a tool to mobilize citizenry; however, they approach it in different ways based on their organizational mission. Some work with groups with different missions in coalition building to build and maximize capacity, while others take directions largely from their members. In addition, their mission affects who they take as potential partners in building coalitions. While organizations A, D, and E build coalitions with national organizations with similar missions, organizations B and C build coalitions with grassroots groups in the communities where they work. Organization C clarified how their mission includes taking cues from the community:

> Our mission statement is protecting communities and the environment. The reason communities come first is because we take our cues from the community. We focus on what the community wants (Organization C).

This translates into building coalitions in the community rather than with national level groups. Although organization B similarly draws from their mission, they broaden their framing to encompass a much bigger issue of the current democratic system. Their framework for mission encourages local community to self-government, as well as

challenges the regulatory structure of law. This distinguishes them from other national organizations that are mobilizing the public against fracking.

4.4.2. Audience

Interview data indicate that the five organizations perceive their audiences to be dynamic. As noted earlier in Table 2, four of the organizations work with rural audiences, while three work with urban audiences. These two audience types reflect differences with respect to the proximity to fracking sites on the Marcellus Shale: (1) people in areas close proximity to existing or potential fracking sites such as the rural areas of Allegheny, Dauphin, and Franklin counties of Pennsylvania, as well as Ulster County of New York and (2) urban areas that are relatively distant from fracking sites, that is, Pittsburgh, Philadelphia, and New York City.

Audience is an important factor because it informs the relationships that underlie the strategies and tactics used by these interest groups in prognostic and motivational framing. For instance, personnel in organizations A, B, C, and D are likely to have more close relationships with their membership because they work closely with impacted communities. As a result, in their approaches to prognostic framing, they offer programming that provides assistance specific to the context and needs of the community. Those working in urban settings have different interaction with their audiences. For instance, organization E has some personal relationships with their membership, however, most of their constituents are contacted anonymously via social media and email blasts. Furthermore, they elevate stories of frontline communities, but

do not directly engage with them firsthand. At the same time, organizations A, D, and E recognize the level of involvement of some of their constituents may vary and occasionally go beyond their primary environmental and public health framing of risks associated to deepen their message with more active members. In these circumstances, they might use the framework of needing stronger public protection from big polluters, or safe access to state parks and natural sites.

All of the organizations take audience into account in considering what actions to promote. Legal actions are taken by organizations working in rural communities, more than those in urban settings. Because drilling activities are directly impacting frontline "shale" communities, organizations working with these audiences are more likely to engage in legal action than those in urban settings like organization A and E. For organizations working in urban areas, actions reflect the fact that people in these areas have capacity to offer support for pressure on elected officials.

4.4.3. Political Context

The political arena in Pennsylvania and New York are different. Pennsylvania has over a decade of pro-fracking policies, whereas, at the time of this study, New York had a moratorium, with the intention of introducing regulations for fracking. Given this policy context, organizations working in each state are using prognostic and motivational framing differently. At the time of this study, the groups were calling for a ban in New York. They moderated their prognostic framing to address the political context of Pennsylvania. They identified the challenges of stopping an ongoing industry and instead

of a ban, pushed for stricter regulations in Pennsylvania. Those in Pennsylvania have identified regulating industry as a solution to tackle fracking with government agencies as key responsible actors, whereas, those in New York find it more realistic to push for a ban on fracking with the legislature and Governor as the responsible actor. Further, organization B works in pro-fracking Pennsylvania and identified changing government processes entirely as the solution to stop fracking, with citizen as responsible actors.

4.5. Influence of Three Factors on Framing Tasks

Taking the above breakdown of the three factors (mission, audience, and policy context) and their role in organizational framing to mobilize opposition to fracking, we start to see how they work in the context of different framing tasks. In some instances, some of the factors have greater influence than others. The following explains the confluence and relative importance of these factors with respect to each of the framing tasks. This assessment shows the value of considering all three to more fully understand variation in the dynamics framing in the context of interest group mobilization.

4.5.1. Influence of Three Factors on Diagnostic Framing

Diagnostic framing is strongly influenced by mission, although audience and policy context play a role to influence diagnostic framing as well. All five organizations diagnose the issue of fracking in ways that relate to their mission statements, which guides their main messages. A dominant focus on environmental and public health risks reflects the primary focus of the missions of these organizations. The addition of social and economic risks to the diagnosis of the problem by organizations B and C reflects the

fact that they are working to mobilize audiences in rural communities in pro-fracking Pennsylvania and anti-fracking New York, respectively. In defining the problem of fracking, these organizations identify a connection between fracking and the experience of disruption to economic situations that people in these communities either already have experienced or might experience in the future. Notably, this influence of audience on diagnostic framing does not extend to the two other organizations that have a presence in rural communities in Pennsylvania (organizations A and D). Organization D makes the case that they must remain within their mission, which focuses on environmental and public health risks; anything outside of that realm is secondary and therefore, not a priority for them. Organization A might be expected to respond similarly. Thus, the influence of audience on diagnostic framing in this case is not uniform.

The difference in diagnostic framing between organization B and C illustrates the additional influence of policy context in this case setting. Organization B is working to mobilize rural audiences within a pro-fracking state and organization C is doing the same within a pro-moratorium state. The difference between these two states with respect to fracking policy gives rise to the difference in diagnostic framing between these two organizations. Organization B sees the pro-fracking policy in Pennsylvania as a problem of democracy attributable to the failure of government institutions to provide a way for those in rural communities opposed to fracking to prevent it from occurring in their communities. Organization C works in a policy context where government institutions appeared to have listened to objections to fracking raised by citizens. Thus their diagnosis does not identify democracy as part of the problem. However, organization B's

mission includes a concern for citizen action in policy processes, and organization B is not active in rural communities in New York. This raises a question about whether they seek out situations with audiences where people have a concern about a lack of responsiveness in government institutions. The evidence arising from organization B suggests an interactive relationship among mission, audience, and policy context in diagnostic framing.

Overall, the evidence about diagnostic framing in this case illustrates the central importance of mission to the task, but this influence is moderated by audience and policy context, albeit unevenly and in potentially complex ways.

4.5.2. Influence of Three Factors on Prognostic Framing

Prognostic framing is strongly influenced by policy context and audience, although mission also plays a role in this task. Policy context affects prognostic framing quite a bit, as solutions are based on the policies already in place. Two of the three organizations working in New York promoted a ban on fracking in the state, as they found this goal tangible. In Pennsylvania, organizations are more likely to organize around building stronger regulations and holding industries accountable to them, given the pro-fracking policies in the state. For instance, while D operates in both states, their prognostic framing changes by state based on the policy context. To seek a ban on fracking in Pennsylvania would, in their estimation, be overreaching and unrealistic, whereas in New York it seemed an achievable solution.

Organization C provides insight into how mission and audience can moderate such an assessment of possible solutions to an identified problem. They work in New York, but unlike the other organizations in New York (D and E), they promoted regulation of industry, not a ban on fracking. A central part of organization C's mission is to work with members of the communities they are organizing. As a consequence, in their on-the-ground work with rural communities in New York they promoted regulating, fracking rather than banning it. This combination of mission and audience affected their position on solutions to the problems associated with fracking. As one member of organization C put it:

> We focus primarily on frontline communities…. The primary mission in our organizing is to work with what we call, 'impacted communities' or what we call 'frontline communities.' How we define organizing is informed by and driven by the needs of those frontline communities (Organization C).

Rural and urban communities are targeted and organized in different ways. For instance, organization D works in both rural and urban communities, but they engage with these audiences differently. Since urban communities are indirectly affected by fracking, organization D uses and amplifies the stories of frontline communities to illustrate the problems of fracking in their efforts to organize in urban communities. In working with rural communities, they find their audience does not need to be educated about fracking because they experience it directly in their communities. Instead, organization D canvasses in these areas to seek funding for the campaign against fracking and this contributes to building the movement.

The third factor, mission, played a role in prognostic framing primarily by having set the stage for the solutions identified in the prognostic framing task. That is, by establishing a foundational framing of the problem through diagnostic framing, mission provides the basis for the solutions and agents of change in prognostic framing. For organizations whose missions led them to diagnose the problem primarily in terms of environmental and public health risks, with industry as the primary causal agent of these risks, the solutions lie in regulations and bans on the practice. Organization B stands out as different in this context in that, as noted above, their mission includes a component of promoting democracy which provided a basis for diagnosing a problem related to democracy. What follows logically from this is a focus on a different type of solution and set of actors implementing that solution – changing the governance system with citizens as the primary actors in the effort.

Overall, the evidence from this case illustrates how policy context and audience influence prognostic framing, with some additional complexity introduced with respect to how mission plays an interactive role in this framing task.

4.5.3. Influence of Three Factors on Motivational Framing

Motivational framing is influenced by mission, audience, and policy context. Mission plays a role in how the groups in this study approach coalition building, political, and/or legal action. Organizations A, D, and E have similar histories and overall vision of working on environmental reform as it relates to preservation and conservation. Their approaches to coalition building reflect this as they work with other groups that share

their concerns and assessment of the problems and potential solutions to fracking. Mission also affects how organizations B and C approach coalition building. Each of these organizations has as a part of their mission to work with communities directly affected by the issue/problem at hand. While B and C diagnose the fracking problem differently and propose different solutions, they share in common this work in communities and their priority is to build coalitions with grassroots groups for mobilizing action.

As one might expect, policy context affects motivational framing particularly as it relates to political action. Organizations D and E work in New York where the policy context provided an opening to promote a ban on fracking, and their approach to motivational framing reflected this policy context. That is, their motivational framing includes mobilizing action to put pressure on elected officials, and, in the case of organization D to elect new officials sympathetic to their cause. In contrast, political action on the part of organizations A, D, and E working in Pennsylvania focused more on comments in public hearings held at the local level. In the case of organization B, they did not see much opportunity in the existing political structure in Pennsylvania to have an impact, and as a result, made efforts to change the political structure altogether.

The role of audience is evident in mobilization through legal action. In this case, relative proximity to the impacts of fracking provides a basis for choosing this approach to mobilization. Thus, the organizations working in rural areas where the direct impacts are proximate use legal action as a part of motivational framing. In contrast, where the organizations are working in urban areas, which are relatively distant from the direct

impacts of fracking, legal action is not salient. Organization D works on the ground in both urban areas in New York and Pennsylvania and in rural areas in Pennsylvania, and draws on legal action in the rural areas but not the urban areas. However, organization A, which works in both urban and rural areas in Pennsylvania, and does not use legal action as an approach to mobilization. This suggests that factors beyond audience and salience of a particular mobilizing action for that audience have an influence on motivational framing.

Overall, the organizations in this case study used a variety of ways to engage people in action, and their choices have been affected by a combination of mission, audience, and policy context. Mission plays a role as it establishes what is in bounds and out of bounds with respect to who these organizations work with in their mobilization efforts. Policy context, and organizational interpretation of that policy context affects what actions seem reasonable, and what might be possible to accomplish with that political action. Finally, these organizations must take into consideration what actions are possible based on their audience. People in rural communities directly affected by fracking may have grounds for legal action whereas those in urban communities can have impact through political processes to change policy through pressure on government officials.

CHAPTER 5: IMPLICATIONS

The social movement literature on framing through the decades following Snow & Benford's (1988) publication has offered insights into framing processes. Yet, as Snow et al. (2014) concluded, relatively few studies focus on framing as a dependent variable. Even so, based on the existing literature, one would expect organizational mission as a reflection of collective identity, audience, and policy context as a reflection of political opportunity to affect framing. The results of this study confirm that these factors do indeed affect framing. It is unique in providing an assessment of how these factors influence each of the framing tasks in differential and sometimes interactive ways.

In the case of mobilization against fracking, mission plays a dominant role in diagnostic framing, and in establishing the nature of the problem, influences subsequent tasks. However, to understand how organizations approach the framing tasks, it is important to consider who they conceive of as their audiences, and this is connected to diagnostic framing. In order to understand how organizations approach diagnostic framing requires attention to both mission and potential audiences. This study confirms what is known in the literature, that insofar as an organization wants to reach broader audiences, they can consider a broader diagnostic frame, which may go beyond their established mission and, by extension, the collective identity of the organization. But Dunlap & Mertig (1992) warn that in doing so, organizations run the risk of mission drift. However, the data from organization C provides an interesting point in response: as a mission statement includes serving communities and looks to the communities to define

the problem, then the potential exists for movement organizations to expand the diagnostic framing of problems beyond what it might typically focus on.

Beyond diagnostic framing, the results of this study illustrate a complex set of dynamics related to prognostic and motivational framing tasks in which audience and policy context play a strong influential role. In brief, place matters. This stands in contrast to Snow et al.'s (2007) finding with respect to how newspapers framed the French riots of 2005. In that study, the factors found to have statistical significance for diagnostic and prognostic framing were identities and time. They did not find a relationship between place (country) and the framing tasks. While this research similarly finds that collective identity as measured by organizational mission affects diagnostic framing, it shows how place, as reflected in audiences (rural as proximate, and urban as distant) and policy context, affect prognostic and motivational framing. The organizations pursuing these tasks make choices about how to frame solutions and grounds for action with their audiences and policy context as central considerations. However, the organizations do not all make the same choices under similar circumstances. This suggests that while mission, audience, and policy context are important to understanding the dynamics of framing, other factors are in play.

This study focused on three factors as variables affecting framing. The results provide a fuller explanation of how movement organizations engage in framing tasks than if only one factor had been considered, for example, organizational mission. By assessing the influence of multiple factors through the perspective of the three framing tasks, it was possible to evaluate qualitative differences in the influence of the factors. It

was also possible to identify some of the interactive dynamics at work in movement mobilization. That said, other factors this study did not consider are likely also important. Thus future research could investigate the influence of a fuller array of factors on framing. These might include (1) resource constraints faced by the organizations, (2) actions and messages of countermovement organizations in the setting (those who support fracking), and (3) actions and messages of the organizations targeted as sources of the problem or as the agents of change (various industry and government entities)

Beyond considering additional factors that influence framing, it is relevant to note that this study did not assess how variations in framing might affect outcomes, in other words, measuring success and failure. Additional insights could be gained through research that carries the causal process out from (1) factors influencing framing to (2) framing influencing outcomes. This could provide a basis for understanding the implications of the intersection of contextual factors with framing for the effectiveness of movement organizations in mobilizing their audiences. Studies that include framing as both dependent and independent variables would address this more complete causal process.

In general, this research provides a response to Snow et al.'s (2014) call for research on the dynamic nature of framing and to additional study of framing as a dependent variable. The results provide insights into the variation in frames and framing that can occur at the organizational level inside a movement, such as the one against hydraulic fracturing in the Marcellus Shale, and illustrates the explanatory value of

investigating multiple factors as they relate to the distinct framing tasks identified by Snow & Benford (1988).

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Appendix A: Methodology

A.1. Qualitative Inquiry

Theoretical foundations shape and inform research design. They also provide rationale for the choices of research methods and the ways in which they are applied (Crotty, 1998). Qualitative research often aims to generate and/or test theory. (Patton, 2012). It can provide a way for researchers also develop explanations of actions, narratives, and the relationships between theory and practice (Glesne, 2011). The research in this thesis stems from qualitative methodologies, drawing specifically from a case study approach.

A.1.1. Case Study Approach

Case study research refers to the study of a case in which a bounded integrated system or systems are created by the researcher as a part of the research design (Stake, 1995). For Schramm (1971), "the essence of a case study, the central tendency among all types of case study, is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what result." According to Stake (1995), case study aims to know extensively and intensively about the single case, that is, the researcher examines a part or the whole of a case. In other words, this approach primarily aims to understand a single case or a series of cases at great detail, rather than observing a generalized issue. At the same time, case studies can be generalizable to theory, but should not be to populations or universes; that is, case study allows

researchers to focus on a single case, and subsequently retain a universal perspective (Yin, 2014).

Stake (2000) distinguishes three types of case studies: intrinsic, instrumental, and collective. The intrinsic case study is when the case is of primary interest and provides better understanding for the study. Instrumental case study refers to restructuring or redrawing a generalization, where the case becomes secondary to understanding a particular phenomenon. Finally, collective case study is when researchers study several cases within the same project. In this research, case study is a useful research approach. To understand the ways in which different factors affect how interest group frame the issue of hydraulic fracturing to mobilize opposition, organizational mission, processes, and strategies require examination. As such, qualitative investigation provides an avenue to gather data about it. The qualitative descriptions of people from the organizations, and the representations on their websites and in documents provide important data to describe how they frame the issue.

A.1.2. Research Subjectivity & Validity

Qualitative research faces criticisms and challenges from some scholars concerning validity and subjectivity (Gergen & Gergen, 2000). Validity and subjectivity in qualitative research refers to questioning the quality of the research, and whether the findings of the study are accurately supported by evidence (Patton, 2012). Because the research methods employed by qualitative researchers often heavily rely on researcher subjectivity and interpretation, Seale (1999) explains that some scholars question the

integrity of this form of research. In fact, Denzin and Lincoln (1994) coined the phrase, crisis of validity, referring to this phenomenon.

Triangulation is a method used by qualitative researchers to strengthen a study and establish validity in their studies. Triangulation refers to the practice of analyzing a research question from multiple viewpoints (Patton, 2012). This can be achieved by using a variety of methods, measures, researchers, and perspectives in a study. According to Patton (2012) research that only uses single method approach are more susceptible to bias. However, a common misconception of triangulation is consistency across data sources, that is, the notion that different kinds of data yield same result (Patton, 2012). In fact, inconsistencies in findings across the diverse data does not mean invalid research, but rather, creates an opportunity for deeper and more nuanced insight.

In addition to triangulation, subjectivity transparency is equally important in qualitative research. The intention in doing qualitative research is to have an understanding of the range of frames and strategies that social movements have drawn on to leverage opposition to controversies. My interest in this case study is very personal: I was an organizer, and my involvement interviewing other organizers is an intimate process. Being now on the academic side of the process as explained by Glesne (2011), I recognize how imperative it is to be connected to my research and transparent about my background. The relationship I have with organizers in the fracking arena equips me with the unique opportunity to gain robust data that other researchers may not be able to attain because they may lack this fundamental relationship.

Lastly, the role of analytic memo serves to mitigate the risk of subjectivity. According to Saldaña (2013), memos are a place to "dump your brain about the participants, phenomenon, or process under investigation by thinking and thus writing and thus thinking even more about them." In essence, they somewhat resemble a researcher's journal to document and reflect on research study. Analytic memos are imperative in the development and understanding of qualitative research findings (Saldaña, 2013). For Saldaña (2013), memos can also later serve as data during the coding process. Writing periodic memos as a researcher allows room to explore subjectivity, and unfold new knowledge and findings in an unbiased nature. In other words, the memos create space to explore new learnings, rather than unintentionally insert bias in the text.

A.2. Data Gathering

This study was a comparative case analysis of national level organizations in New York and Pennsylvania that draw on distinct strategies to engage with the hydraulic fracturing issue. These included those who are calling for stricter regulations or a ban on through strategies such as (1) education and raising awareness in communities, (2) coalition-building, (3) communicating with public policy decision makers, and (4) taking legal action. This research identified a total population of five national environmental organizations mobilizing opposition to hydraulic fracturing on the ground in Pennsylvania and/or New York. These organizations hold 501(c) nonprofit status, and are understood to work on a national level because their efforts span across the

boundaries of more than one state (Americans Against Fracking, 2014), reaching the wider American public through multiple issue areas (Carmichael et al., 2012). They also are opposed to hydraulic fracturing and have offices in rural and/or urban settings in New York and/or Pennsylvania. This study focused on these organizations not only for their national statement, but because they also have a local presence in the New York and/or Pennsylvania Marcellus Shale regions.

A.2.1. Purposeful Sampling

The qualitative design strategy of purposeful sampling selects information rich cases for in-depth analysis (Patton, 2012). These information rich cases are connected to the purpose of the research. Drawing from this design, interest groups organizing around the fracking issue were purposefully sampled. Although there are many national level organizations that have signed onto coalitions or have expressed comments on policy views opposed to fracking, only a handful of these groups are actively organizing targeted audiences. As such, five organizations were identified that met the sampling criteria: (1) they each hold 501(c) nonprofit status, (2) work on a national level and have national capacity to mobilize, (3) have local offices in rural and/or urban areas within my case sites, and (4) dedicate staff, as well as substantial time and resources to the anti-fracking movement.

A.2.2. Semi-Structured Interviewing

Interviewing generates raw data for qualitative researchers about people's direct experiences, opinions, knowledge, and feelings (Patton, 2012). This mode of data

gathering consists of verbatim quotations that qualitative researchers can later interpret. Semi-structured interviewing, also referred to as focused interviewing, uses open-ended questions to yield more specific information than an unstructured format (Rubin & Rubin, 2011). For instance, in a less-structured approach, the researcher may take more airtime, providing context. Conversely, in the more-structured approach, the researcher may pose specific questions to attain data (Rubin & Rubin, 2011). Qualitative case study researchers may choose this approach over other forms of interviewing because it can provide reliable and comparable data in a formal setting. By having direct contact with interviewees, researchers are given the opportunity to interact with and document their data directly (Rubin & Rubin, 2011). An interview guide is often used, that is, a list of questions and prepared topic conversations. Researchers may also choose to record the data for later analysis (Patton, 2012).

Eleven semi-structured interviews with personnel in the five national environmental organizations were conducted, with 2-3 interviews per organization. The number of personnel from each organization was determined by the size of the staff for each group. Each of these interviews was performed with voluntary participants in 30-45 minute sessions. While most of the interviews were conducted in person in the offices and settings of the organizations, some were performed over the phone. Every participant agreed to be recorded. Data from organizational documents and websites have also contributed to support findings. These methods similarly provide insight into how these organizations have framed perceived risks associating with fracking, as well as how they strategically frame the issue, and mobilize specific audiences.

Because this research required participation of national environmental organizations, more specifically, organizers, program directors, and national organizing directors, I was required to attain exemption from the Institutional Review Board (IRB). The IRB is charged with approving, monitoring, and reviewing behavioral research as a way to protect human participation. Upon receipt of the IRB exemption, scheduling of interviews was permitted to commence. Research participants were asked to give verbal consent once their confidentiality and right to withdraw from research were articulated. Recorded interviews, field notes, transcriptions, and other personal data were kept in locked files, both electronic and hard copies. Even email correspondences were kept separately and securely with the interview data. Furthermore, the use of codenames (A-E) provides anonymity for the participating organizations.

A.2.3. Semi-Structured Interview Guide

Objective 1: Determine how national environmental organizations frame risks associated with hydraulic fracturing, for example environmental health, public health, and economic risks.

1. How do you communicate fracking to the public?
2. What are some of the key messages you communicate to the public?
3. Are there other important players that influence your approach to messaging?
4. Who are the other "players" in the controversy: industry, government, advocacy organizations, oppositional organizations, public health groups, etc….
5. Do you emphasize risks associated with fracking to influence the public?
6. What are some of these risks?
7. Are you specifically using risks relating to the environment, public health, or economic issues? Can you give me specific examples? When you communicate the risks, what are the sources of this information?
8. What about transparency and the public's access to these sources of information? Peer-reviewed research, research funding, etc. (both perceived and actual)

Objective 2: Determine the national environmental organizations' strategies, and evaluate the links between the strategies and the ways of framing risks.

1. How has your messaging shaped strategies to draw in audiences?
2. Does your organization work with other groups or has it joined coalitions to target audiences?
3. What are some of these organizations or coalitions? How are your messages same or distinct from these other groups?
4. How closely do you and your organization work with these groups and/or coalitions?
5. In what ways does your organization support or work in collaboration with these groups?

Objective 3: Identify who *the organizations* perceive of as their audiences (urban, rural, other demographics, and/or elected officials) and if they reframe risks to the different audience types.

1. What are the demographics in the region you are working in? Who do you target as your audience
2. Do you believe the audience is within the community you work in and/or is it more far reaching like in rural, urban, or other communities outside the boundaries of your regional office?
3. Are there different strategies for the different target audiences?
4. Do you talk to legislatures? How? How do you approach them?

5. How do you reframe the risks associated with fracking to communicate with these different demographics?
6. What are some of the ways your organization reframes these risks?

Objective 5: Determine how community organizers define success relative to their way of framing risks and the degree to which they believe they have been successful to date.

1. How do you and the organization define success?
2. How much do you believe your organization's messaging has been successful to date?
3. Can you provide examples?
4. How do you know when you've changed somebody's mind?
5. How have your efforts translated into specific actions?

A.2.4. Document Gathering

Document gathering includes any written materials such as publications and reports, surveys and questionnaires, websites, blogs, personal journal entries, photographs (Patton, 2012). Data from document gathering entails studying excerpts, quotations, or entire segments of documents gathered in a way that records and preserves context. Applying multiple data-gathering technique allows this research to elevate and support findings (Glesne, 2011; Patton, 2012). Analyzing organizational documents similarly provides insight into how these organizations have framed perceived risks associating with fracking. Data from organizational documents and websites have also contributed to support findings. These methods similarly provide insight into how these organizations have framed perceived risks associating with fracking, as well as how they strategically frame the issue, and mobilize specific audiences.

A.3. Data Processing

Before data analysis, Wolcott (1994) would say qualitative research requires the attention of data processing. The business of coding and entering data into computer programs is a step in itself before analysis can begin. Once data is gathered through interviews and other methods, it is coded. Data can be organized into narrative descriptions with major themes, categories, and insight through content analysis (Patton, 2002). Researchers often equate data analysis with coding data; however, St. Pierre & Jackson (2014) argue that analysis does not end with coding. In fact, qualitative

researchers must undergo data processing before beginning analysis, as a way to organize, manage, and filter the raw data (St. Pierre & Jackson, 2014).

Interview data for this research was transcribed verbatim using the software, HyperTRANSCRIBE. Recorded notes regarding the organizations' history with the fracking issue, as well as the participants' working relationship with the organization were tracked in an Excel document for reference. This background information provided context as to how long the organization has been framing perceived risks associated with fracking, as well as how informed and invested the participants were with their host organizations. The handwritten notes taken during and after interviews have also been considered in analysis.

A.3.1. Coding

Description and quotations drawn from interviews and document analysis are the raw data of qualitative inquiry (Patton, 2012). Coding methods such as attribute coding, descriptive coding, pattern coding, and thematic coding are some important techniques in analyzing qualitative data (Saldaña, 2013). According to Saldaña (2013), attribute coding refers to tracking informational details of data while description coding refers to narratives that may inform the research question. Additionally, pattern coding identifies emergent themes, configurations, and/or explanations, and thematic coding links the data together (Saldaña, 2013). This research incorporates elements of each of these coding techniques. See Appendix B for coding structure. Data for this research were categorized according to organization. Patterns and emergent themes were tracked using

HyperRESEARCH, as well as Word Document. A first-cycle coding method was used before transitioning into second-cycle coding.

A.3.2. Thematic Coding Structure

"From cradle to grave"	Defining fracking
Interest Group	Structure of organization
	How organization became involved with fracking
National vs. State	National focus
	New York
	Pennsylvania: "Resource Extraction State"
Primary Audiences: "Different levels of involvement"	Urban Communities
	Impacted Communities/ Frontline Communities/ Shale Fields/ "Belly of the Beast"
	Progressive Communities
	NYS Governor
Secondary/ Tertiary Audiences	Rural Communities
	Impacted Communities/ Frontline Communities/ Shale Fields/ "Belly of the Beast"
	Local Elected Officials/ Municipal Officials
	Legislative Champions
	Federal-level officials
Demographics	Democratic
	Republican
	Progressive communities
	Different socio-economic backgrounds
Messaging	Primary Message
	Ways of Communicating
	Framing risks
	Reframing
Organizing Strategy	Canvassing
	Engagement
	Information
	Media
	Grassroots groups
	Coalitions
	Political Action
	Legal Action
	Rights-Based Organizing
	Mobilization
Success	Messaging
	Influence
	Public engagement
	Process change

A.4. Data Analysis

During data analysis, qualitative researchers are charged with organizing the seen, heard, and read to create knowledge from what has been obtained (Glesne, 2011). Wolcott (1994) asserts that in the initial process of data analysis, qualitative researchers must aim to stay as closely with the data as originally recorded. For him, the intent is for the data to "speak for themselves." The underlying idea is that data analysis is a "dialectic" process, that description, analysis, and interpretation are fluid in data analysis. In other words, researchers should be aware that there is no point where description stops and analysis begins, and that data are more nuanced and shift more subtly. It is also important to note that "raw" or initial data are laced with analytical and interpretative nuances in the very process of becoming data (Wolcott, 1994), as qualitative researchers are often in the process of researching, listening, filtering, and storytelling (Jackson& Mazzei, 2012).

A comparative analysis was used in this research between national environmental organizations working in urban and/or rural settings, as well as the political influence of the different states: Pennsylvania and New York. Thematic coding was used to describe the frames the organizations used as they relate to varied audiences. This allowed the systematic examination of the ways in which organizations can converge and diverge in their organizing strategies. The data was categorized into groups, where emergent themes were identified to inform the social movement literature.

Appendix B: Extended Literature Review

B.1. Social Movements

While social movements often begin as "causes," there is a distinction between a movement and a cause. Goodwin & Jasper (2004) explain that causes are forms of collective action in which members pursue social change. Movements, on the other hand, are social formations that require large numbers of people who seek change as their shared interest. For Stone (2011), interests and issues define each other. An interest group can emerge because of the interest of a collective body; they define the issue and create their mission statement based on this collective interest. Conversely, an emerging issue can also form and shape the interest group, and later help to develop its mission. Along the same vein, an interest group's membership can shape its interests (Stone, 2011).

McAdam (1996) asserts that collective action is often related to threat. It is based on a shared perception of a specific risk to the disenfranchised (Goodwin & Jasper, 2004). For example, in the case of hydraulic fracturing, collective action can be in the shape of mobilization, based on a shared sense of the perceived risks of this technology. In addition, Goodwin & Jasper (2004) argue that political processes may influence movement mobilization. In the case of hydraulic fracturing, the responses in the political system to support hydraulic fracturing may contribute to mobilization. The challenge for groups opposing hydraulic fracturing is to mobilize large numbers of people to support their cause, and to successfully launch a movement.

Mobilization refers to the ways people commit themselves to support a movement (Gamson, 1975). Stone (2011) adds, mobilization is a collective effort and occurs when people identify their problems as a shared experience; they subsequently organize to influence policy. Political processes may also influence movement mobilization by interest groups. Core organizers or challengers seek to advance a set of goals and look for opportunities, frame issues, and identify resources as their strategies (Goodwin & Jasper, 2004). In a similar vein, Freudenburg (1993) analyzes the ways mobilization influences organizers' attitudes. According to Gamson (1975), success usually refers to the achievement of explicitly stated goals, but can also be regarded as a set of outcomes as a consequence of mobilization. The process of mobilization is an important factor in this research, as policy outcomes can be influenced by changes in public perception (Goodwin & Jasper, 2004).

Burke (1968) explains that there are four types of citizen participation strategies that can be used to mobilize: education, behavioral change, cooptation, and staff supplementation. Education as a strategy strengthens the public to become aware of an issue to spur community development. For Burke (1968), behavioral change is intended to induce change in the individual's behavior through group influence. This strategy includes participation in decision-making processes through elected officials and public-policy decision-makers. Cooptation as a strategy refers to the inclusion of individuals who have sufficient resources or influence to benefit the organization (Burke, 1968). This may include inviting noteworthy persons to be on the advisory committee, or staffing those who may offer legal support for the organization. In a similar way, a staff-

supplementation strategy refers to volunteerism made by citizens to carry out efforts of an organization that does not have the means to do so itself (Burke, 1968). For instance, if an organization cannot actively organize non-violent direct action, they can still use a staff-supplementation strategy to engage volunteers, while supporting the participants with training or financial relief.

Stone (2011) explains that interest groups attract members by raising public awareness about issues. According to Stone (2011), there should be criteria for defining who is a member of a community and who is not. Membership qualifications determine who is allowed to participate, as well as receive advantages for being members. Along the same vein, interest groups are comprised of defined memberships, which reflect the mission of the group. Environmental organizations typically reflect members who care deeply about the wellbeing of their environment. Members can join because they feel affinity with the cause or mission of the interest group. Stone (2011) also explains that membership increases with relationships. "We are subject to extremely strong influence by peers, co-workers, family, and other groups of which we are a part" (Stone 2011). In other words, organization membership increases because a person's neighbor participates in the collective effort. Furthermore, the degree to which peoples' lives are affected by an issue can also influence interest group membership and public participation. The riskier people perceive of an issue, the more likely they are to participate in a collective effort.

Interest groups communicate with their members in person or via emails and other social media platforms. These groups may also provide their members with monthly

newsletters or exclusive access to documents they publish. Stone (2011) describes this as incentivizing people to join groups and work for a collective good and so avoid the free rider problem. If individuals have little to no incentive to join, they may unfairly receive the benefits. Some groups may also post their published documents on their websites. For them, transparency and access to information may serve to build trust and grow membership over time.

B.1.1. The Modern Environmental Movement

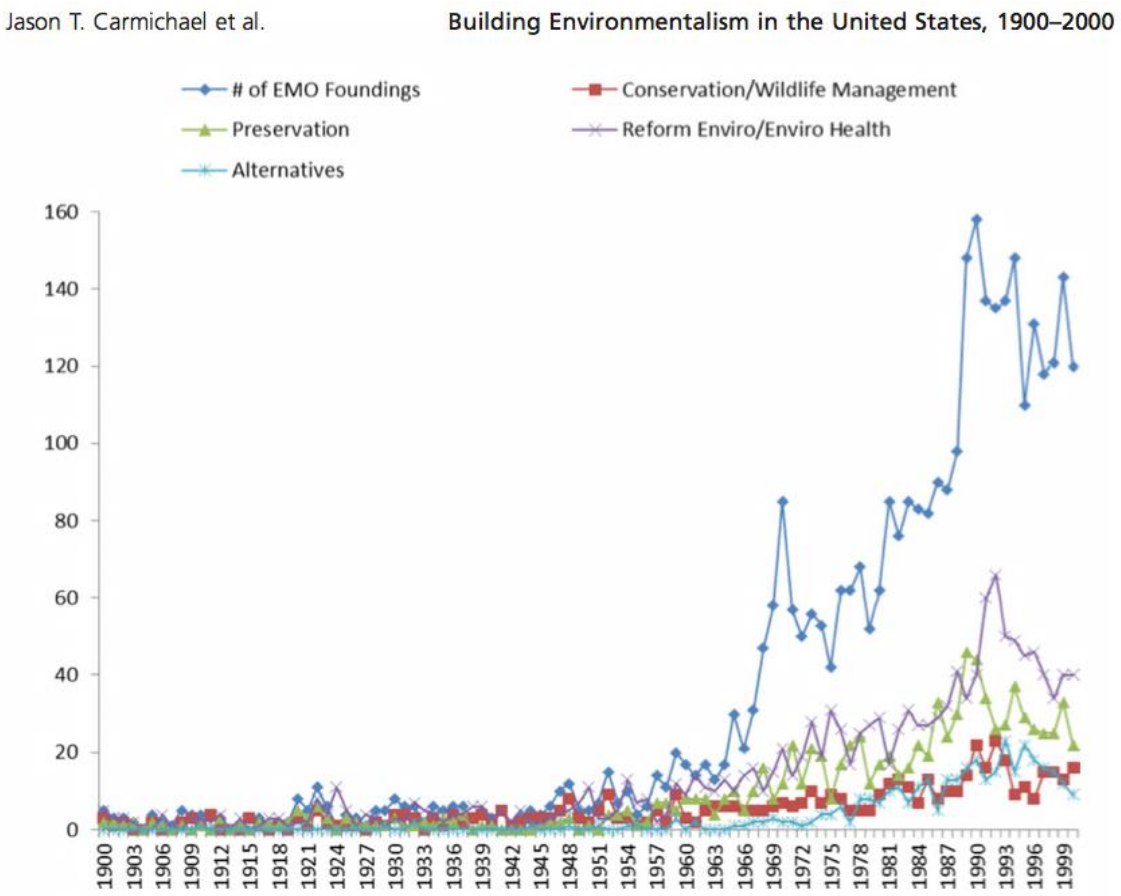

Figure 4: Foundings of U.S. Environmental Organizations from 1900 to 2000

According to McLaughlin & Khawaja (2000), the environmental movement is one of the largest, most diverse social movements in the U.S. Throughout its early history, the movement faced many challenges to its validity until the 1960s and 1970s, when political voice provided legitimization of the movement (Carmichael et al., 2012; McLaughlin & Khawaja, 2000). O'Neill (2012) documents the history of the environmental movement: post-industrial revolution emphasized nature and preservation; the 1960s and early 1970s marked the emergence of environmental organizations; the 1980s and 1990s showcased a commitment to social justice and economic equity. This decade can be characterized by controversial or perceived high-risk issues such as global climate change translating to local risks like the case of hydraulic fracturing. As a consequence, the next period of the environmental movement is likely to be shaped by the phenomenon described in this research.

Figure 4 illustrates the rise of environmental organizations from 1900 to 2000 (Carmichael et al., 2012). It is important to make note of this data because these interest groups have emerged out of the modern environmental movement. Carmichael et al. (2002) show that the establishment of environmental organizations focusing on environmental reform or environmental health has had a greater increase than organizations focusing on other areas such as preservation and conservation. This is significant to make note of because this research looks at organizations in the former category.

Given the high level of public support for environmental quality, Mertig, Dunlap & Morrison (2012) predict that national environmental organizations will continue to

attract members to combat risks to that quality; this is in contrast to local groups who may not persist beyond their issue (Mertig et al., 2012). However, institutionalization and increasing bureaucratization of the national environmental movement have led critics within the movement to advocate for more radical frames and tactics (McLaughlin & Khawaja, 2000). Thus, it is valuable to have some understanding of the range of frames and strategies that interest groups have drawn on to mobilize opposition to hydraulic fracturing.

B.2. Theory of Framing

The theory of framing is used within the context of social movements through the work of Erving Goffman. Frames are a "schemata of interpretation" and allow people to view occurrences in the world through these schemata (Goffman, 1974). For Williams & Benford (1996), "the frame acts as a boundary that keeps some elements in view and others out of view…growing certain symbolic elements together and keeping others out." In this way, frames help influence and give meaning to every day occurrences (Goffman, 1974). Similarly, Schon & Rein (1994) define frames as "structures of beliefs, perception, and appreciation." Frames and interests are distinct from each other, yet frames shape and may be used to promote interests (Schon & Rein, 1994).

Controversies occur when parties hold conflicting frames (Schon & Rein, 1994). Schon & Rein (1994) argue that conflicting frames are usually not subject to conscious attention and reasoning. In other words, disputes are immune to factual resolutions or reasoned arguments (Snow et al., 1986). Furthermore, frames determine what will be

considered the fact, and how it will inform action. Given the controversies about hydraulic fracturing, we expect to find conflicting frames. Rhetorical frames refer to the persuasive use of story and argument, and action frames inform policy practice (Schon & Rein, 1994). Frames shape motivation for action; therefore, organizations must be strategic in their framing to attract support for collective action. Benford & Snow (2000) define this as frame articulation.

When interest groups are organizing citizenry to build a movement, they must be strategic in their organizing. A broader framing can be beneficial for organizations when mobilizing citizenry, as a wider frame would encompass a more diverse audience. Evidence suggests that reframing an issue can successfully shift environmental attitudes of previously unsympathetic groups. Feinberg & Willer (2013) conducted research to examine liberal and conservative American attitudes about the environment. They note that different groups are likely to be positively or negatively influenced by different messages. The concept of framing captures the notion of articulating an issue in diverse ways to adjust meanings. In other words, issues can be framed to resonate with diverse groups of people. Feinberg & Willer's (2013) findings demonstrate the effectiveness of reframing environmental issues in different moral terms; for them, liberal arguments for the environment resonated with American conservatives once the issue was reframed to fit conservative values.

O'Neill (2012) similarly makes recommendations for environmental organizations to use broader frames to mobilize and organize citizenry. Movements responding to industrial and technological risks, more specifically related to mining and

resource extraction would benefit from framing the issue in broader terms as a way to connect to the human rights movement. This strategic way of framing would not only increase membership, connecting indigenous groups as well as people concerned with land rights, but also create room for coalitions with environmental justice groups and human rights organizations who are also interested in displacement of populations due to resource extraction. Interest groups can apply these ways of framing as strategies when mobilizing citizenry. The resulting audiences can span a wider array of demographics, irrespective of political and interest-based ideologies.

While Feinberg & Willer (2013), O'Neill (2012), and Stone (2011) would suggest more multi-dimensional frames are necessary in effective mobilization, Dunlap & Mertig (1992) would add that the number of frames interest groups choose should be concise, finite, and relevant to their mission and vision. The scope of the organization should be based on their mission to avoid the slippery slope of mission creep, that is, temporarily getting sidetracked and compromising primary goals. The identity of the organization can be lost if its mission becomes too broad, which may compromise the quality of its membership. Resources and capacity may also limit organizations' use of frames when organizing. Organizations may not have enough funding to sign onto every environmental issue that emerges. Using small and finite number of frames, and being willing to reframe the issue when necessary can allow organizations to build a complex and diverse movement. In other words, there is a trade-off between broader frames and narrow frames, and organizations need to strike a balance in order to be relevant to current issues and demographics.

Haidt (2012) describes the notion of moral triggers. He explains that interest groups must make their causes relevant to the public by triggering the public. He writes, "To get your vote, your money, or your time, they must activate at least one of your moral foundations." This method of triggering the public into action can derive with symbols. For Stone (2011), symbols are narratives that illustrate meaning or reveal untold stories. Framing an issue in multiple ways can reach more diverse audiences (Feinberg & Willer, 2013).

In analyzing how frames are used in mobilization, Benford & Snow (2000) have outlined three distinct framing tasks: diagnostic, prognostic, and motivational framing. Diagnostic framing identifies the problem, prognostic framing attributes tactics to the problem, and motivational framing provides a rationale for engaging in collective action (Benford & Snow, 2000). Although all three framing tasks overlap in intention and meaning, they are distinct from one another. In the case of hydraulic fracturing, the ways organizers use diagnostic, prognostic, and motivational framing can influence the organization's impact on public perceptions. In other words, interest groups can influence the public's perception of risks through strategic framing (Snow et al., 1986).

Research has shown that framing an issue by influential actors like the media can cause the public to focus on these concerns when formulating their opinions (Price, Tewksbury, & Powers, 1997). Interest groups can similarly influence the public's perception of risks through strategic framing (Snow et al., 1986). Therefore, framing issues and risks can have considerable implications for how the public thinks about them.

B.3. Theory of Risks

The theory of risk is studied and applied in multiple ways across disciplinary fields of knowledge. In the social sciences, the work of Mary Douglas is among the earliest. For Douglas, risk perceptions are viewed largely as individual responses to a threat and are the result of previous experiences that influence value systems. As described by Douglas & Wildavsky (1982), risk perception theory claims the following: (1) the argument on risk is "deep and widespread," (2) people process risks differently, and (3) knowledge and action are often misaligned. Therefore, the debate over what is risky, how to measure it, and what to do about it remains unresolved.

B.3.1. Public Perception

A growing body of literature challenges the legitimacy of the debate about real versus perceived risk. For Douglas and Wildavsky (1982), risk perception is essentially social, rather than scientific, as the avenues to assess risks are influenced by the social assumptions people are likely to make. The ways the public perceives and evaluates threats to their safety and wellbeing depends on values, attitudes, social influences, and cultural identities (Douglas and Wildavsky, 1982). Weber, Hair & Fowler (2000) note that those who share similar life experiences, attitudes, and values evaluate risk similarly. Thus, individual perceptions of risk can be understood as a shared experience. Characterizing attitudes and perceptions of environmental risks in particular, requires understanding human and societal interactions more than understanding how the environment works (Weber et al., 2000).

Freudenburg (1988) discusses the rationality of public risk perception. For him, real and perceived risk is less rational than is often assumed to be, especially in conversations regarding controversial technologies. He argues that the gap between the scientific community's perception of risk and that of the general public is small; after all, science is not immune to error and uncertainty. Freudenburg (1988) outlines studies that examine how these two parties process risk, and found that both the general public and scientists often reach "ill-advised conclusions." On the one hand, the general public commonly practices prudence, that is, uses caution in uncertain scenarios. On the other hand, scientists are shown to exhibit a deeper kind of prudence in situations that require guesswork due to limited or nonexistent evidence. In a pluralistic society in which people are members of more than one group – scientists are not strictly scientists; they belong to other social groups as well – it becomes more complicated to navigate the dynamic processing of risks.

In the public policy arena, risk perception can be categorized as (1) the risk of foreign attack or encroachment, (2) internal collapse, and failure of law and order, (3) fear for the environment and abuse of technology, and (4) economic failure and loss of prosperity (Douglas and Wildavsky, 1982). The case of hydraulic fracturing is interesting because it touches some of these categories. Inarguably, the fear for the environment and abuse of technology has been framed as the dominant risk of hydraulic fracturing; however, the decision to eliminate this process can leave feelings of economic failure and loss of prosperity. Douglas and Wildavsky (1982) would assert, people tend to rank the categories of risk, rather than attend to all dimensions of risks: "It might be

better for mental health to limit rather than expand sources of concern…otherwise, merely counting risky objects would leave us defenseless." Therefore, the question that needs to be understood is how people choose to ignore the every day potential risks that surround them (i.e. driving, smoking, etc.) and instead, interact with only selected issues (i.e. the controversy around hydraulic fracturing).

Kasperson et al. (1988) findings have profound implications for the risk literature, as they suggest that events can be defined and shaped by social amplification of an influential party. Amplification occurs when information is transferred and when societies respond to these understandings of risks. The filtering of information about risks may occur as early as in the risk assessment itself, that is, during the actual calculations of the probabilities and consequences of undesired outcomes. This early risk assessment can significantly alter the form and content of the risk information produced and conveyed by the original holder, usually experts. In this way, interest groups have the capacity to amplify their perceptions of risks to their audiences. Freudenburg (1993) adds that risk-related social movements arise because they perceive government institutions to have failed them. He documents 46% of community groups were formed due to concerns over suspected health hazards that government failed to monitor. Similarly, environmental organizations have used the public health framework to mobilize opposition to hydraulic fracturing. For them, this technology poses real public health risks, as well as risks to air and water.

Renn et al. (1992) show that institutions often serve as drivers of how the public perceives and responds to risks. They argue that risk perception is socially mediated.

That is, people often develop their perception of risk first through the ways the media frames the issues (Renn et al., 1992). Individuals develop attitudes and opinions based on secondary framing. As such, they filter information and categorize meaning in relation to other experiences and preexisting beliefs. Similarly, interest groups can be influential in how the public perceives risks (Snow et al., 1986). The ways national environmental organizations are framing environmental, public health, and economic risks associated with hydraulic fracturing can not only shape public perception, but also contribute to preexisting lack of trust in industry. Thus, individuals who have direct experience with the issue can develop perceptions of risk as a consequence of indirect interactions (Snow et al., 1986).

The risk literature outlines several key influences on risk perception. These influences include perceived knowledge of the effects of the issue, trust in the institutions responsible for managing risk, and demographic and geographic characteristics (Brasier et al., 2013; Freudenburg, 1993; Weber et al., 2000). According to Freudenburg (1993), perceived trustworthiness of an institution responsible for conveying information and managing risks is pivotal to the level of public perception of risk. He states that studies of technological disasters have found that citizen groups often report "great frustration" in accessing credible scientific information. Similarly, Stephan (2012) explains that information disclosure programs in environmental policy are essential to the public's trust. In other words, the public's trust in hydraulic fracturing is tied strongly to their access to knowledge and transparency of the industry. In the case of hydraulic fracturing, because the chemicals used in the process are undisclosed, it can be expected that there

may be a relationship between the public's level of trust in the industry and the level of perceived risk.

B.3.2. Persuasion and Influence

Moscovici (1976) and Petty & Cacioppo (1996) offer counter arguments. They would add that the body of literature on persuasion and influence suggest a range of mixed results, with lack of consistent findings and consensus. Moscovici (1976) refers to influence as a persuasion factor. He evaluates social influence, and explains that most people conform to the pressures of society, and that contradictions raise doubts among groups. People generally conform to the views and opinions of those they know and trust, like friends or specific media sources (Moscovici, 1976). Furthermore, when people are confronted with facing something that contradicts their preconceived versions of the truth, they become "profoundly disturbed." This external conflict transforms into an internal one.

Influence is rooted in a conflict and its outcome represents changing the other or being changed by the other (Moscovici, 1976). According to Freudenburg (1993), credibility refers to believability, and remains independent of behaviors. Moscovici (1976) explains that individuals who are perceived as objective exert the greatest influence because they give an impression of "having arrived at a conclusion by ripe deliberation and of being disinterested." At the same time, experts are likely to have more influence than those perceived to be uninformed. Moscovici (1976) concludes that direct influence on a person may prove ineffective, while uninformed indirect influence is

very great. Furthermore, people are likely to overestimate the knowledgeability of those they like and to underestimate those they do not like. In this way, people are likely to accept the ideas and subsequently be influenced by those they perceive as trustworthy and to have a sound judgment.

Petty & Cacioppo (1996) developed the Elaboration Likelihood Model (ELM) of persuasion to address the inconsistent conclusions on effective persuasion. The ELM is an integrative framework that states that any one variable can influence attitudes in a positive or negative direction. For instance, some studies showed that experts are likely to influence persuasion; however, other studies show no impact, or else a reduced impact on persuasion (Petty & Cacioppo, 1996). If this is the case, the general public's trust in hydraulic fracturing may or may not be tied to their access to knowledge and transparency of the industry.

Petty & Cacioppo (1996) explain that an important and effective determinant of persuasion is to frame the issue to relate it to the general public. This strategy may shift public perceptions, though personal relevance may influence those already sympathetic to the issue. As such, educational strategies are only effective with those who are pre-disposed to agree in the first place; those who disagree or are uninterested will not be influenced. In the case of hydraulic fracturing, environmental organizations and industries alike have dedicated efforts to educate the public as a persuasive strategy. As studies by Moscovici (1976) and Petty & Cacioppo (1996) have demonstrated however, this strategy is rarely effective in convincing members of the opposing party. In fact, the

scholars would recommend that these groups instead focus on enhancing their messaging to personally appeal to indecisive members.

B.4. Hydraulic Fracturing

Controversy about hydraulic fracturing has demanded the attention of existing environmental interest groups and has also led to the creation of new groups (Ladd, 2013). Blohm, Peichel, Smith, & Kougentakis (2012) and Davis & Fisk (2014) have documented controversies associated with the use of hydraulic fracturing to extract natural gas from shale deposits. In this context, the general public and environmental organizations have raised perceived environmental, public health, and economic risks associated with hydraulic fracturing. They seek to influence public support and government policy related to this technology. Landowners, communities, interest groups, regulators, and policymakers have contributed to the debate on this issue (Blohm et al., 2012). This debate focuses on the relative benefits and risks associated with the new technology, the use of which has expanded dramatically in the last decade. It is useful to understand the nature and extent of hydraulic fracturing before describing the specifics of the controversies.

Hydraulic fracturing is a new technologically advanced or "unconventional" method of drilling for natural gas (Wang, Chen, Jha, & Rogers, 2014). Unlike conventional drilling, which uses vertical pipes, hydraulic fracturing refers to the use of deep horizontal pipes that can reach multiple expanses of shale gas reserves, making it a technologically more efficient extractive method (Blohm et al., 2012). According to

Allen (2012), hydraulic fracturing is used in 90% of natural gas mines across the nation. Each well that is developed with this extraction technology requires the use of 2-10 million gallons of water (Wang et al., 2014), 1,500-2,000 tons of sand or proppant (Pearson, 2013), and the injection of chemicals, the majority of which are undisclosed (Kharak, Thordsen, Conaway, & Thomas, 2013). The fracturing mixture is then released at high pressures to break apart shale rock formations as a way to capture the natural gas.

The U.S. has 272 proven natural gas reserves (Kharak et al., 2013), that is, known reserves that can be made available for use using current technologies. The use of hydraulic fracturing technologies has provided industry an opportunity to generate energy in the U.S. for domestic needs and foreign export from reserves that were previously thought inaccessible (Marongiu-Porcu et al., 2013). In 2003, shale gas became economically viable as a result of increased oil and gas prices (Wang et al., 2014), which prompted a rush to drill in the U.S. The U.S. Energy Information Administration (2012b) has documented the rapid expansion of hydraulic fracturing in the U.S. For example, by 2012, there were nearly 490,000 producing natural gas wells, which is 60,000 more than there were in 2005 (U.S. EIA, 2012b).

Despite the rapid expansion of industrial hydraulic fracturing, scientific understanding of the impacts and regulatory monitoring of the process have been slow, at least according to the literature (Steinzor, Subra, & Sumi, 2013). It can be argued that given the fast pace of development, science and policymakers have struggled to keep up with the industry. In response, community members and grassroots groups have organized to document the perceived environmental, public health, and economic risks of

hydraulic fracturing (Howarth, 2014; Wang et al., 2014). Boudet et al. (2014) suggest that hydraulic fracturing has become the most publicly observed environmental issue of our time. They also found that hydraulic fracturing has developed a largely negative environmental reputation, perhaps as a consequence of this community attention (Boudet et al., 2014). Steinzor et al. (2013) posit that the limited availability of unbiased information has contributed to the larger negative public perception of hydraulic fracturing. To better understand this dynamic, the social movement literature is helpful.

Perceived environmental, public health, and economic risks associated with hydraulic fracturing have served as a catalyst for community members and grassroots groups to mobilize opposition and challenge government officials to uphold stricter regulations for drilling. According to Coman, a national comprehensive regulatory standard to govern hydraulic fracturing does not currently exist (2012). The Energy Policy Act of 2005 exempts hydraulic fracturing from regulations under the Safe Drinking Water Act and the Clean Water Act (Coman, 2012; Moré, 2013). Because hydraulic fracturing is not considered to be an underground injection, it does not require a permit under the Safe Drinking Water Act. Additionally, hydraulic fracturing does not fall under the jurisdiction of the Clean Water Act because it enters the earth far below the water table, and proponents have made the case that because of this depth, it cannot pollute groundwater (Coman, 2012). These exemptions have been the focus of considerable debate (Finewood & Stroup, 2012).

One area gathering significant attention and controversy over hydraulic fracturing is the Marcellus Shale region (Brasier et al., 2011). The region stretches across Ohio,

West Virginia, Pennsylvania, New York, and smaller areas of Maryland, Kentucky, and Tennessee (Allen, 2012). The Marcellus Shale is rich with deposits of natural gas, covering 34 million acres (Brasier et al., 2011), and has been coined the "Saudi Arabia of natural gas" (Coman, 2012). In 2008, it was estimated that this region might contain 500 trillion cubic feet of gas, enough for twenty years of use (Allen, 2012; Brasier et al., 2011). In 2012(a), the U.S. Energy Information Administration released a report confirming that the Marcellus Shale contains 141 trillion cubic feet of recoverable reserves of national gas, making this region the largest source in the world. Steinzor et al. (2013) found that in Pennsylvania alone, 5,900 wells have been developed for unconventional drilling. They also explain that more than 11,700 wells have been permitted between 2005 and 2012 (Steinzor et al., 2013). Pennsylvania's Washington County was the first hydraulic fracturing site in the Marcellus Shale in 2002, and now the county is one of the top-five gas producers in the U.S. (Allen, 2012). Drilling activity in the New York portion of the Marcellus has not occurred largely due to ongoing public resistance (Brasier et al., 2011).

In general, Davis & Fisk (2014) have found that people residing in urban areas are more inclined to oppose hydraulic fracturing and favor stricter regulations than those residing in rural areas. Furthermore, unconventional gas development in rural areas in Colorado is less controversial than in urban settings within the same state. Davis & Fisk (2014) found that because urban communities are unaccustomed to industrial drilling activities and may have differing demographics and attitudes than rural communities, they may be more likely to resist drilling operations. This analysis reflects the case in

New York, where vast numbers of New York City residents immediately resisted the implementation of drilling regulations in the state and opposed hydraulic fracturing altogether. Consequently, the NY legislatures imposed a moratorium on hydraulic fracturing, and regulations were put on hold pending environmental review (NYS DEC, 2014). In comparison, the issue in rural Pennsylvania has been relatively less controversial, and overall perceptions of risk have been lower, while perceptions of benefits have been higher (Schafft, Borlu, & Glenna, 2013). Stedman et al. (2012) concluded that Pennsylvania respondents characterized gas development in a more positive light than did New York respondents. A recent survey found that 41% of Pennsylvania residents feel that hydraulic fracturing creates more benefits than concerns (Boudet et al., 2014).

In this context, an array of public and environmental organizations have raised concerns about the perceived environmental, public health, and economic risks of hydraulic fracturing. They raise concerns about hydraulic fracturing as a process that involves the introduction of large, transient populations for labor, clearing of land for well pads, construction of access roads and compressor stations, transporting of water, sand, and chemicals, processing of extracted gas, and transporting of wastewater for treatment or disposal. Each of these practices can contribute to disruption and poses risks to communities near or onsite of drilling activities (Boudet et al., 2014). Even so, others have argued that there exist substantial environmental and economic benefits to be gained from hydraulic fracturing (Marongiu-Porcu et al., 2013). The following summarizes the

perceived risks and benefits that have been identified in debates about hydraulic fracturing.

B.4.1. Environmental Risks

Natural and biophysical science research studies have examined impacts of hydraulic fracturing on biodiversity (Kiviat, 2013), aquatic ecosystems (Weltman-Fahs & Taylor, 2013), and climate change (Howarth, 2014), as well as forest dynamics (Davis & Robinson, 2012). Most notably, research has focused on threats to surface and groundwater due to chemical leaks, spills, methane migration, and large quantities of water withdrawal (Wang et al., 2014). Communities living in close proximity to hydraulic fracturing activities have expressed complaints about contamination of their water wells due to this process. Comen (2012) documents more than 1,000 court cases alleging water contamination from hydraulic fracturing. Rahm et al. (2013) also document improper disposal of hydraulic fracturing wastewater and its effects on communities and the environment. Reports of improper disposal of hydraulic fracturing wastewater contribute to community and ecological hazards. According to Coman (2012), a study found that when water and hydraulic fracturing chemicals are pumped into the earth, the uranium naturally present in the shale is dissolved in water, which can enter biological and aquatic ecosystems.

B.4.2. Environmental Benefits

Contrary to the literature on the environmental risks, there is also substantial literature on the environmental benefits of hydraulic fracturing. Natural gas extraction is

perceived to burn cleaner than fossil fuels like coal or oil (Hultman et al., 2011). Federal agencies like the Department of Energy evaluate natural gas as a preferred fuel for energy-efficiency, and have advocated for a greater use of natural gas as a "bridge" fuel towards a renewable energy future (Eaton, 2013). The U.S. Energy Information Administration projects that natural gas will supply nearly half of the U.S. gas production by 2035, which has the potential to reshape energy policy with regards to greenhouse gas emissions (Hultman et al., 2011). Furthermore, Burnham et al. (2012) found that the life-cycle analysis of fractured gas emissions are significantly less than other sources of energy like gas and coal. Some counter-arguments to this have identified methane as a greenhouse gas and as such, it too poses environmental and public health risks (Finewood & Stroup, 2012).

B.4.3. Public Health Risks

Many of the perceived public health risks are tied to the environmental risks of hydraulic fracturing. Literature suggests a link between horizontal drilling activity with nearby contamination of drinking water supplies (Finewood & Stroup, 2012). Others correlate threats to local air quality and exposure to chemicals used in the fracturing mixture with public health problems such as asthma (McKenzie et al., 2012). McKenzie et al. (2012) also concluded in their study that toxicity of air emissions near natural gas sites puts residents living close by at greater public health risk than those living further away. Air emission can additionally pose acute and chronic long-term hazards to public health (Finewood & Stroup, 2012).

According to Steinzor et al. (2013), reports of negative health impacts to communities residing on or near hydraulic fracturing sites have been documented in the media and through research by large environmental organizations. Although Colborn et al. (2014) conducted a study to look at human health impacts relating to pollutant discharge of hydraulic fracturing chemicals, their study does not quantify the potential risks to public health. It nevertheless highlighted the fact that some of the chemicals used in the hydraulic fracturing process are known endocrine disruptors, which affect human reproduction and development. However, there is no published epidemiological study on hydraulic fracturing to date that assesses the extent of exposure-related adverse public health effects. For Finkel & Hays (2013), absence of data does not imply hydraulic fracturing does not pose public health risks.

B.4.4. Economic Risks

The perceived health impacts associated with hydraulic fracturing activity are accompanied by perceived economic risks in communities near drilling activity. Social science research has shown impacts of hydraulic fracturing related to the creation of a boom and bust economy, stress on healthcare systems, public schools, recreation facilities, truck traffic, local road damages, as well as decrease in property values, and increase in crime rates as a consequence of increased transient workers within a community (Boudet et al., 2014; Brasier et al., 2011). Ladd (2013) found that more than half of the residents interviewed in Haynesville Shale area in Louisiana believe increased damages to local streets and roads are a direct result of a large volume of truck traffic due

to hydraulic fracturing. Furthermore, 29% of those interviewed expressed that the economic benefits of hydraulic fracturing are inequitably distributed among the communities, and that there is little trust in the industry to adequately compensate landowners' for their mineral rights (Ladd, 2013).

B.4.5. Economic Benefits

The economic benefits of hydraulic fracturing have been framed as an increase in well-paying jobs, more secure domestic energy supplies, immediate royalty payments for landowners who have leased their lands, boosts to local communities through secondary services such as new businesses and restaurants, and tax revenues to local governments (Boudet et al., 2014; Ladd, 2013; Wiseman, 2009). Furthermore, the expansion of hydraulic fracturing is projected to make the U.S. a net exporter of natural gas and potentially the world's largest oil producer by 2017 (Boudet et al., 2014). Pennsylvania's Marcellus Shale alone is estimated to be worth $500 billion (Allen, 2012). Ladd (2013) found that hydraulic fracturing has created new markets and uses for natural gas, as well as new programs and opportunities for research at state universities.

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